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Supplier Document #: 21-1-20102-222

Supplier Rev.: 1

Supplier Date: 07/25/07

Reference #: NVT-DV-00011

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NE Nevada Engineering Kathy Mrotek

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Transportation Data Pedigree Form

Complete only applicable items.

Subcontractor:	Item Number/Title/Revision:	Submittal Date:	SRCT No.:
Shannon & Wilson, Inc.	Construction Aggregate Report – Mina Rail Corridor, Rev. 1 (Submittal No. 7.30)	25 Jul 2007	07-00026

Section I. Submittal Information (includes above information)

Submittal Description and Revision Summary for Entire Submittal:

This report documents information collected from a literature review and field reconnaissance performed for the purpose identifying potential sources of construction aggregate along the proposed Mina alignment of the Nevada Rail Line for the Yucca Mountain Project.

Revision Summary:
Rev 0, 10 Apr 07: Original submittal
Rev 1, 25 Jul 07: Revised Table 1, Table 3, and Appendix B to address copyrighted material, and corrected typographical errors

Special Instructions:

Section II. Data File Information (Add lines below if needed for additional files. Indicate "Last item" or "End of list" after last line used.)

Filename	Rev.	File Size	Description (File description and revision summary for file)	Application and Version/ Add-in or Extension and Version
_Cover 25 July 07.ppt	1	698 KB	Preliminary Construction Aggregate Report Cover Image	MS PowerPoint 2003 Presentation
SW-ColourMidWidth100.ctb	1	5 KB	Preliminary Construction Aggregate Report Cover	AutoCAD 2007
_Spines 2007.dwg	1	685 KB	Preliminary Construction Aggregate Report Spine	AutoCAD 2007
Spine 1inch copy.jpg	1	276 KB	Preliminary Construction Aggregate Report Spine Image	Corel Photo-Paint 8.0
Jacobs LOGO.jpg	1	29 KB	Preliminary Construction Aggregate Report Spine Image	Corel Photo-Paint 8.0
BSC Logo.jpg	1	22 KB	Preliminary Construction Aggregate Report Cover and CD Label Image	Corel Photo-Paint 8.0
_CD Labels 2007.dwg	1	619 KB	Preliminary Construction Aggregate Report CD and Appendx C Labels	AutoCAD 2007
CD Background 2007.jpg	1	1,280 KB	Preliminary Construction Aggregate Report CD Label Image	Corel Photo-Paint 8.0
21-1-20102-222-Rev1-X.doc	1	283 KB	Preliminary Construction Aggregate Report Title Sheet	MS Word 2003 SP2
21-1-20102-222-Change-History-M-Agg.doc	1	34 KB	Preliminary Construction Aggregate Report Change History Sheet	MS Word 2003 SP2
21-1-20102-222-Rev1.doc	1	268 KB	Preliminary Construction Aggregate Report Text, Appendix Title Sheets and Text, Subappendix Title Sheets and Text	MS Word 2003 SP2
21-1-20102-222-T1-Rev1.doc	1	49 KB	Preliminary Construction Aggregate Report, Table 1, Recommended Limiting Values of Testing for Railroad Ballast	MS Word 2003 SP2
21-1-20102-222-T2-Rev1.xls	1	109 KB	Preliminary Construction Aggregate Report,Table 2, Potential Ballast Source Areas	MS Excel 2003 SP2
21-1-20102-222-T3-Rev1.doc	1	31 KB	Preliminary Construction Aggregate Report,Table 3, Criteria for Subballast Sources	MS Word 2003 SP2
21-1-20102-222-T4-Rev1.doc	1	43 KB	Preliminary Construction Aggregate Report,Table 4, Unified Soil Classification System Soils Suitable fro Subballast	MS Word 2003 SP2

Subcontractor:	Item Number/Title/Revision:	Submittal Date:	SRCT No.:
Shannon & Wilson, Inc.	Construction Aggregate Report – Mina Rail Corridor, Rev. 1 (Submittal No. 7.30)	25 Jul 2007	07-00026

21-1-20102-222-T5-Rev1.xls	1	44 KB	Preliminary Construction Aggregate Report,Table 5, Summary of Potential Sand Sources	MS Excel 2003 SP2
21-1-20102-222-T6-Rev1.xls	1	81 KB	Preliminary Construction Aggregate Report,Table 6, Summary of Potential Gravel Sources	MS Excel 2003 SP2
21-1-20102-222-T7-Rev1.xls	1	23 KB	Preliminary Construction Aggregate Report,Table 7, Recommended Ballast Source Areas	MS Excel 2003 SP2
21-1-20102-222 Grain Size Distributions (Date Print 25 July 07).dwg	1	74 KB	Preliminary Construction Aggregate Report,Figures 11, Grain Size Distribution, Potential Sand Sources and Figure 12 Grain Size Distribution, Potential Gravel Sources	AutoCAD 2007
21-1-20102-222 Fig 5.dwg	1	50 KB	Preliminary Construction Aggregate Report, Figure 5, Conceptual Subballast/Aggregate Production Site Layout	AutoCAD 2007
NDOT Material Sites Data_gINT.gpj	1	29,512 KB	Preliminary Construction Aggregate Report,Figures A-1 to A-25, Grain Size Distributions for Material Sites	gINT Project File
NDOT Material Sites Data_gINT export.xls	1	1,728 KB	Preliminary Construction Aggregate Report,Figures A-1 to A-25, Grain Size Distributions for Material Sites	MS Excel 2003 SP2
21-1-20102-222-Photo log-Rev1.xls	1	284 KB	Preliminary Construction Aggregate Report,Table C-1, Log of Photographs	MS Excel 2003 SP2
SOIL FIELD REFERENCE, rev-jul07.pdf	1	1,485 KB	Preliminary Construction Aggregate Report Soil Field Reference	Adobe Acrobat 7.0
ROCK FIELD REFERENCE, rev-jul07.pdf	1	624 KB	Preliminary Construction Aggregate Report Rock Field Reference	Adobe Acrobat 7.0
Mina_S&W_CAR.mdb	1	23,752 KB	ESRI 9.2 Personal Geodatabase containing the following Shannon & Wilson, Inc. native files pertaining to studies related to the Preliminary Construction Aggregate Report dated 07/25/07.	ESRI Geodatabase
Photos	1	47,206 KB	Preliminary Construction Aggregate Report Appendix C photos folder	Corel PHOTO-PAINT 8.0 Image
MinaAggRpt,R1,25Jul07.pdf	1	211,996 KB	Adobe Acrobat report	Adobe Acrobat 7.0
			----------------------Last Item----------------------	

Section III. Metadata

☒ **GIS Metadata** All GIS data is preferred in ArcGIS9.1 UTM, NAD1983, Zone11, Feet.	Projection: UTM Datum: NAD 83 Zone: 11 N Units: Feet
☐ **CAD Metadata** CAD drawings are preferred in **Bentley MicroStation V8 and/or InRoads** and should adhere to established **CAD standards**.	Level descriptions: Scale: Units of Measurement: Horizontal and Vertical Datum:

BSC	Transportation Data Pedigree Form	QA: N/A
	Complete only applicable items.	Page 3 of 3

Subcontractor:	Item Number/Title/Revision:	Submittal Date:	SRCT No.:
Shannon & Wilson, Inc.	Construction Aggregate Report – Mina Rail Corridor, Rev. 1 (Submittal No. 7.30)	25 Jul 2007	07-00026

Section IV. Data Screening (Completed by BSC personnel)

Acceptable for Review?	Screener Name:	Signature:	Date:
☒ Yes* ☐ No	Cathy Stettler	Cathy Stettler	8/21/07

*If "Yes", Data Storage Location:

Comments: *(Justification for returning submittal is* ***required****; other comments are optional.)*

Section V. STR/STR Support Disposition of Submittal

Process for Review?	** If "No", date returned:	Comments:	
☐ Yes ☐ No**			
STR/STR Support Name: Kathy Mrotek KAM 8/22/07		Signature: Wm. J. Garfield	Date: 8/22/07

QA: N/A

Data Definitions for Construction Aggregate Report GIS Features

Feature Class: Ballast_Source_Study_areas_sw_mina

Description: This polygon feature class represents investigated areas of ballast sources. This area was designated by S&W and BSC.

Purpose: Area of study for investigation to identify potential ballast sources.

Revision History:
No Changes.

Number of records: 2

Field Name	Data Type	Description of field
OBJECTID	Object ID	Unique identifier generated by the software. This identifier will act as a primary key.
SHAPE	Geometry	Polygon
SHAPE_Length	Double	Length of feature in feet generated by software.
SHAPE_Area	Double	Area of feature in feet generated by software.

Feature Class: Buffer_of_mina022307_SW_10

Description: This polygon feature class represents a 10 mile buffer of the alignment file "mina022307.shp" provided by BSC.

Purpose: To identify limits of project area.

Revision History:
No Changes.

Number of records: 1

Field Name	Data Type	Description of field
OBJECTID	Object ID	Unique identifier generated by the software. This identifier will act as a primary key.
SHAPE	Geometry	Polygon.
BufferDist	Double	Distance, in miles, of buffer based on mina022307.shp.
SHAPE_Length	Double	Length of feature in feet generated by software.
SHAPE_Area	Double	Area of feature in feet generated by software.

Feature Class: facilities_quarry_sw_mina

Description: This polygon feature class represents Shannon & Wilson, Inc. selected areas for potential facilities associated with quarry sites within the Mina Corridor.

Purpose: To identify quarry site locations and associated facilities as part of the conceptual layout of potential quarry sites.

Revision History:
No Changes.

Number of records: 26

Field Name	Data Type	Description of field
OBJECTID	Object ID	Unique identifier generated by the software. This identifier will act as a primary key.
SHAPE	Geometry	Polygon.
Site_Type	Text	Purpose or potential use of feature.
Study_Area	Text	Quarry site location of feature.
SHAPE_Length	Double	Length of feature in feet generated by software.
SHAPE_Area	Double	Area of feature in feet generated by software.

Feature Class: Geology_ballast_sw_mina

Description: This polygon feature class represents geologic units compiled from various county source maps (See Plate 1) at a 250k scale.

Purpose: To identify geologic units associated with the investigation of suitable ballast source areas.

Revision History:
No Changes.

Number of records: 215

Field Name	Data Type	Description of field
OBJECTID	Object ID	Unique identifier generated by the software. This identifier will act as a primary key.
SHAPE	Geometry	Polygon.
TYPE	Text	Geologic unit description.
County	Text	County map that the geologic unit originates from.
SITENAME	Text	Related quarry site.
SHAPE_Length	Double	Length of feature in feet generated by software.
SHAPE_Area	Double	Area of feature in feet generated by software.

Feature Class: title_block_250k_sw_mina

Description: This polygon feature class is for drafting presentation purposes only. This feature is associated with the production of Shannon & Wilson, Inc. plates only. It contains no data associated with study of this report.

Purpose: For presentation purposes only. The feature allows areas to be masked at a 250k scale to clearly represent the title block area.

Revision History:
No Changes.

Number of records: 1

Field Name	Data Type	Description of field
OBJECTID	Object ID	Unique identifier generated by the software. This identifier will act as a primary key.
SHAPE	Geometry	Polygon.
SHAPE_Length	Double	Length of feature in feet generated by software.
SHAPE_Area	Double	Area of feature in feet generated by software.

Feature Class: Gravel_Sources_sw_mina

Description: Polygon feature class showing Soil Survey Geographic Database (SSURGO) map units with USCS classifications for gravel (GW or GW-GM).

Purpose: To identify potential gravel sources in the Mina Corridor

Revision History:
No Changes.

Number of records: 2647

Field Name	Data Type	Description of field
OBJECTID	Object ID	Unique identifier generated by the software. This identifier will act as a primary key.
SHAPE	Geometry	Point.
AREASYMBOL	Text	SSURGO survey area
MUSYM	Text	SSURGO map symbol
MUKEY	Text	SSURGO soil unit key ID
muname	Text	SSURGO map unit description
SHAPE_Length	Double	Length of feature in feet generated by software.
SHAPE_Area	Double	Area of feature in feet generated by software.
Type	Text	USCS Classification for gravel (GW, GW-GM)

Feature Class: Sand_Sources_sw_mina

Description: Polygon feature class showing Soil Survey Geographic Database (SSURGO) map units with USCS classifications for sand (SW or SW-SM).

Purpose: To identify potential sand sources in the Mina Corridor

Revision History:
No Changes.

Number of records: 799

Field Name	Data Type	Description of field
OBJECTID	Object ID	Unique identifier generated by the software. This identifier will act as a primary key.
SHAPE	Geometry	Point.
AREASYMBOL	Text	SSURGO survey area
MUSYM	Text	SSURGO Map Symbol
MUKEY	Text	SSURGO map unit key ID
muname	Text	SSURGO description
SHAPE_Length	Double	Length of feature in feet generated by software.
SHAPE_Area	Double	Area of feature in feet generated by software.
Type	Text	USCS Classification for sand (SW, SW-SM)

Feature Class: SSURGO_Survey_Areas_sw_mina

Description: Polygon features showing USCS SSURGO survey boundaries in the Mina Corridor

Purpose: To identify sources for SSURGO data used for flagging sand and gravel sources

Revision History:
No Changes.

Number of records: 9

Field Name	Data Type	Description of field
OBJECTID	Object ID	Unique identifier generated by the software. This identifier will act as a primary key.
SHAPE	Geometry	Point.
AREASYMBOL	Text	SSURGO Survey Area
SHAPE_Length	Double	Length of feature in feet generated by software.
SHAPE_Area	Double	Area of feature in feet generated by software.

Feature Class: MineralMaterial_Sales_sw_mina

Description: Features identifying areas of material source areas from NDOT and others.

Purpose: This more inclusive feature class replaces the feature class NDOT_GSA from previous submissions.

Revision History:
No Changes.

Number of records: 248

Field Name	Data Type	Description of field
OBJECTID	Object ID	Unique identifier generated by the software. This identifier will act as a primary key.
SHAPE	Geometry	Polygon.
Status	Text	Status or action of pit area.
Proprietor	Text	Ownership. Identified as NDOT, other, or null.
NDOTID	Text	NDOT ID number (if known).
SHAPE_Length	Double	Length of feature in feet generated by software.
SHAPE_Area	Double	Area of feature in feet generated by software.



Construction Aggregate Report
Mina Rail Corridor

SRCT:
07-00026

Task 2.2a: Preliminary Ballast and Construction Aggregate Sources Report (Submittal No. 7.30)

Rev. 1

Prepared by:

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

In Association With:

JACOBS

Ninyo & Moore

Prepared for:

BECHTEL SAIC COMPANY LLC

Nevada Rail Corridor
Yucca Mountain Project
Geotechnical Analysis
NN-HC4-00197

July 25, 2007

Preliminary Construction Aggregate Report
Rev. 1
Mina Rail Corridor
Yucca Mountain Project, Nevada

Subcontract No. NN-HC4-00197

25 July 2007

SHANNON & WILSON, INC.

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

At Shannon & Wilson, our mission is to be a progressive, well-managed professional consulting firm in the fields of engineering and applied earth sciences. Our goal is to perform our services with the highest degree of professionalism with due consideration to the best interests of the public, our clients, and our employees.

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21-1-20102-222

Prepared using MS-WORD 2003

CHANGE HISTORY

Revision Number	Date	Description of Change
00	10 April 2007	Initial Issue
01	25 July 2007	Revised Table 1, Table 3, and Appendix B, and corrected typographical errors

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ACRONYMS AND ABBREVIATIONS

A	insufficient evidence for certainty rating (as relates to mineral potential)
AASHTO	American Association of State Highway and Transportation Officials
Ag	silver
ANSI	American National Standards Institute
AREMA	American Railway Engineering and Maintenance-of-Way Association
As	arsenic
ASTM	American Society for Testing and Materials
Au	gold
AWWA	American Water Works Association
B	low certainty rating (as relates to mineral potential)
Ba	barium
BAH	Booz Allen Hamilton, Inc.
BBE	Busted Butte East
BCFG	billion cubic feet of gas
Be	beryllium
BGRR	Bullfrog Goldfield Railroad
Bi	bismuth
BLM	U.S. Bureau of Land Management
BMPs	Best Management Practices
BNSF	Burlington Northern Santa Fe Railway Company
BSC	Bechtel SAIC Company, LLC
C	moderate certainty rating (as relates to mineral potential)
CAPP	Chemical Accident Prevention Program
Cd	cadmium
CFR	Code of Federal Regulations
cm	centimeter
Co	cobalt
CPT	cone penetrometer test
Cr	chromium
CRC	Caliente Rail Corridor
CS	common segment
Cu	copper
D	high certainty rating (as relates to mineral potential)
DCM	Design Criteria Manual
DEIS	Draft Environmental Impact Statement
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
EIS	Environmental Impact Statement
EOR	engineer of record
EPA	U.S. Environmental Protection Agency
EWDP	Early Warning Drilling Program

ACRONYMS AND ABBREVIATIONS (CONT.)

F	fluorine
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FOB	free on board
FR	Federal Register
FRA	Federal Railroad Administration
FY	fiscal year
GCMC	Goldfield Consolidated Mines Company
G-DCM	Geotechnical Design Criteria Manual
GF3	Goldfield 3 Route
GIS	Geographic Information System
gpm	gallons per minute
GPS	global positioning system
GROA	Geologic Repository Operations Area
g/t	grams per ton
H	high mineral potential
HASP	Health and Safety Plan
Hg	mercury
HSA	hollow-stem auger
H:V	horizontal to vertical
HSU	hydrostratigraphic units
IDW	investigation-derived waste
in/sec	inches per second
ISRM	International Society of Rock Mechanics
Jacobs	Jacobs Engineering, Inc.
K	potassium
KGRA	known geothermal resource area
km	kilometer
L	low mineral potential
LR2000	Legacy Rehost 2000, a BLM land and mineral use records system
LV&TRR	Las Vegas and Tonopah Railroad
M	moderate mineral potential
Ma	million years old or million years ago or million years before present
MGR	Managed Geologic Repository
MILS	mineral property location database, compiled by the U.S. Bureau of Mines
mm	millimeter
mm/sec	millimeters per second
mm/yr	millimeters per year
MMBO	million barrels of oil
Mn	manganese
MnO	manganese oxide

ACRONYMS AND ABBREVIATIONS (CONT.)

Mo	molybdenum
M&O	Maintenance and Operation
mph	miles per hour
MPR	Mineral Potential Report
MRC	Mina Rail Corridor
MRDI	Mineral Resource Development, Inc.
MRDS	mineral resource dataset, compiled by U.S. Geological Survey
MS	mineral survey
MSE	mechanically stabilized earth
MVGI	Metallic Ventures Gold, Inc.
N&M	Ninyo & Moore, Inc.
Na	sodium
NAC	Nevada Administrative Code
NBMG	Nevada Bureau of Mines and Geology
NDEP	Nevada Division of Environmental Protection
NDOT	Nevada Department of Transportation
NEPA	National Environmental Policy Act
Ni	nickel
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRL	Nevada Rail Line
NRP	Nevada Rail Partners
NTS	Nevada Test Site
NTTR	Nevada Test and Training Range (formerly Nellis Air Force Base and Testing Range)
NVT	Nevada Transportation
NWRPO	Nuclear Waste Repository Project Office
O	no mineral potential
OCRWM	Office of Civilian Radioactive Waste Management
O.D.	outside diameter
opt	ounces per ton
oz	ounce, specifically troy ounce in this report
oz/t	ounces per ton
P	phosphorous
Pb	lead
PGA	peak ground acceleration
PGR	Preliminary Geotechnical Report
PM	particulate matter
POC	Point-of-Contact
ppb	parts per billion
ppm	parts per million

ACRONYMS AND ABBREVIATIONS (CONT.)

PSHA	probabilistic seismic hazard analysis
psi	pounds per square inch
PV	prefabricated vertical
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
R. E	Range East
R. W	Range West
RA DEIS	Rail Alignment Draft Environmental Impact Statement
RFI	Request for Information
RFP	Request for Proposal
ROD	Record of Decision
ROE	right-of-entry
ROW	right-of-way
RQD	Rock Quality Designation
Rs. E	Ranges East
Rs. W	Ranges West
RSS	reinforced soil slopes
S&W	Shannon & Wilson, Inc.
Sb	antimony
Sc	scandium
SCS	Soil Conservation Service
Se	selenium
Sec.	Section
Secs.	Sections
SFRS	steel fiber-reinforced shotcrete
SI	International System of Units
Sm	samarium
Sn	tin
SPT	Standard Penetration Test
Sr	strontium
SR	State Route
SSURGO	Soil Survey Geographic Database
T&TRR	Tonopah and Tidewater Railroad
TBM	Tunnel Boring Machine
T. N	Township North
T. S	Township South
Tl	thallium
tpd	tons per day
Tps. N	Townships North
Tps. S	Townships South

ACRONYMS AND ABBREVIATIONS (CONT.)

tpy	tons per year
tsf	tons per square foot
U	uranium
UPRR	Union Pacific Railroad Company
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USBM	U.S. Bureau of Mines
USBR	U.S. Bureau of Reclamation
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
V	vanadium
W	tungsten
WPCP	Water Pollution Control Permit
WSA	Wilderness Study Area
wt%	weight percent
YMP	Yucca Mountain Project
Zn	zinc

PRELIMINARY CONSTRUCTION AGGREGATE REPORT

MINA RAIL CORRIDOR
YUCCA MOUNTAIN PROJECT, NEVADA

1.0 INTRODUCTION

This report documents preliminary information collected from a literature review and field reconnaissance performed for the purpose of identifying rock and soil deposits that may be potential sources for construction aggregate for the proposed Mina Rail Corridor (MRC) for the Yucca Mountain Project (YMP).

1.1 Project Description

The U.S. Department of Energy (DOE) is studying two corridors in Nevada for possible construction of a rail line to transport spent nuclear fuel and high-level radioactive waste to a proposed repository at Yucca Mountain, Nevada. The corridors, both 0.25 mile-wide, are referred to as the Caliente Rail Corridor (CRC) and the MRC. DOE may eventually select one alignment within one of these corridors for the rail line. This report identifies and examines potential sources of construction aggregate for the Mina corridor.

The MRC originates at the terminus of the Union Pacific Railroad (UPRR) at the Fort Churchill siding near Wabuska, Nevada (Plate 1). From that point, the corridor extends southeastward along various alternate alignments until it intersects with the Caliente corridor either along the Caliente Alternative Alignment GF4 at CRC Station 42710+00 or along Caliente Common Segment CS4 at CRC Station 14146+54. From these intersections, the segment, common to both the Caliente corridor and the Mina corridor, would continue southeastward where it would terminate at Yucca Mountain near the southwest corner of the Nevada Test Site (NTS). Geotechnical and other studies of the segment common to both the Caliente corridor and the Mina corridor have already been completed and are contained several reports, as referenced in subsequent sections.

Approximately 2.7 million in-place[1] tons of crushed rock ballast would be required for new track construction. In addition, approximately 2.4 million tons of subballast would be required for roadbed construction. These quantities are based on project information available during preparation of this report (NRP, 2007), and may be revised. Other construction aggregate that would be required for the MRC include embankment fill, erosion control stone (riprap), road surfacing, and aggregate for concrete; however, estimated quantities of these aggregates have yet to be determined.

1.2 Purpose and Scope

This report provides information to conceptual designers about potential sources of construction aggregate, including rock suitable for processing into ballast, subballast, and erosion-control stone, as well as soil deposits suitable for use as subballast, embankment fill, road surfacing, and aggregate for concrete. Materials used as subballast commonly include crushed stone, natural or crushed gravel, and natural or processed sand, slag, or mixtures of these materials.

The scope of work included a literature review and field reconnaissance along the proposed corridor. The purpose of the literature review was to identify rock and soil deposits with characteristics that make them potential sources for construction materials, either with or without processing. The purpose of the field reconnaissance was to observe soil exposures and rock outcrops of the deposits to assess if they would likely be a suitable source.

Generally, it was assumed that construction aggregate for the project would be obtained from either cuts made for construction of the roadbed or borrow pits and quarries located along the alignment. The MRC incorporates an insufficient number of cut sections to generate the required 2.4 million tons of subballast. Therefore, subballast sources located approximately 10 miles apart along the alignment would be developed during construction to provide the required materials (NRP, 2007). Two sites were visited at a greater distance than 10 miles from the MRC in order to obtain a preliminary geologic confirmation of the quality of the geologic unit. The preference was to be able to obtain subballast within about one-quarter mile of the alignment.

No subsurface explorations or laboratory testing were conducted as part of this study. Evaluation of soil and rock materials for use as construction aggregate was based on visual

[1] "In-place" denotes quantity based on design dimensions and does not include losses or other contingencies.

observation. For use in construction, it is assumed that ballast, subballast, erosion-control stone, and concrete aggregate would have to satisfy the appropriate specifications listed in the latest edition of the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual of Railway Engineering (AREMA, 2007).

As part of the original study for the CRC, a ballast-sourcing cost analysis was completed in order to evaluate the cost-effectiveness of obtaining ballast from a new quarry located along the alignment versus purchasing it from an existing commercial source (Shannon & Wilson, Inc., 2005a). In addition to the cost analysis, that report provides information on environmental considerations and permitting requirements for developing a quarry along the alignment. In general, the cost analysis, environmental and permitting requirements, and conclusions presented in that report for the Caliente corridor are valid for the Mina corridor as well. However, that report was prepared using project information current as of 18 February 2005.

Permitting requirements and environmental considerations for development of borrow pits along the Nevada Rail Line (NRL) could be somewhat different from those requirements and considerations for a rock quarry. These requirements and considerations were initially addressed in a document prepared by Jacobs Engineering, Inc. (2005). Since the completion of that report, new environmental regulations or modifications to existing regulations could have been enacted.

1.3 Acknowledgements

This report was prepared by Shannon & Wilson, Inc. (S&W). Paul Godlewski (Project Manager) and Bill Laprade (Task Manager, Engineering Geologist) provided oversight for the task. George Lightwood, Arthur Geldon, Elizabeth Milodragovich, and William "Bo" Lewis (Project Geologists) performed the literature review, compiled maps showing source areas and land claims, and planned the field activities. The field reconnaissance of most of the corridor was performed by two S&W teams (MT1 and MT2) in conjunction with other tasks, each comprised of an engineer and a geologist. Team MT1 consisted of Art Geldon (team leader) and Scott Pawling, and team MT2 consisted of Keith Rauch (team leader) and Elizabeth Karcheski. Reconnaissance of additional work in 2007 at MN3 and Thorne Yard was completed by team MT7, made up of Bill Laprade (team leader) and Scott Shimel. The additional alignments at Schurz (S4, S5, and S6) were reconnoitered by team MT8 consisting of Paul Zehfuss (team leader) and Nell Beedle. Bill Laprade was the primary author of this report, with contributions

from field, GIS, and other technical staff. Dex McCulloch, Principal-in-Charge, reviewed this report.

1.4 Authorization

This work was performed in general accordance with YMP Technical Services contract No. NN-HC4-00197, Nevada Rail Corridor Geotechnical Analysis. The Mina Corridor studies were authorized by Subcontract Modification 17, effective 15 August 2006. This document was prepared under Work Item 2.2a of the contract, and this version is submittal number 7.30.

2.0 LITERATURE AND DATA REVIEW

2.1 Review of Existing Project Data

A geographical description of the Mina Rail Corridor is presented in the Preliminary Geotechnical Report (Shannon & Wilson, Inc., 2007b). A discussion of the geologic setting, tectonics, regional seismicity, and hydrogeology is also presented there.

2.2 Literature Search and Review

S&W conducted a review of readily accessible literature relevant to the identification of potential ballast, subballast, and other construction aggregate sources. These sources of information included the following:

- Existing county-series geologic maps (1:250,000) published by the Nevada Bureau of Mines and Geology.
- U.S. Geological Survey (USGS) Water-resource Investigations containing lithologic outcrop maps compiled from existing geologic mapping.
- USGS topographic maps at various scales (1:24,000, 1:100,000, and 1:250,000).
- Existing USGS geologic maps at various scales to identify geologic formations, geologic structures, fault locations, and mineral prospects, borrow pits, and quarries.
- A list of Nevada Department of Transportation (NDOT) gravel pit and borrow source locations, and maps and laboratory test data from 24 sites on or adjacent to the MRC (Appendix A).
- A list of private and public (other than NDOT) sand and gravel pits.

- U.S. Department of Agriculture Natural Resources Conservation Service (USDA/NRCS) soil surveys and databases.
- Existing remote-sensing information (aerial photographs, satellite images, and orthophotographs contained in USDA/NRCS soil surveys).
- Other published technical articles, reports, and bulletins containing geologic information and resource data.
- Geographic Information System (GIS) data sets obtained from Bechtel SAIC Company, LLC (BSC) showing land status and ownership.
- BLM LR2000 data for mining and other claims and encumbrances on Nevada BLM lands (U.S. Bureau of Land Management, 2007).

References reviewed and used in the preparation of this report are listed in the reference section, at the end of this report.

The purpose of the literature review was to identify potential ballast, subballast, and other construction aggregate source areas prior to the field reconnaissance. The identification of potential source areas was restricted to land that is open to acquisition of mineral materials and development of quarries and sand and gravel pits through the BLM mineral materials sales program. Specifically, we excluded lands administered by the Department of Defense (DOD), U.S. Bureau of Reclamation (USBR), and the U.S. Forest Service (USFS). USFS-administered lands were excluded since they are typically at higher elevations, and no portion of the MRC currently passes through USFS lands.

Based on the literature, outcrops of rock formations most commonly used for processing into ballast (granite and traprock) were identified and plotted on a set of 1:250,000-scale maps (Plate 1). Based on previous studies (field and laboratory) for the CRC (Shannon & Wilson, 2006) and on the perceived widespread outcrops of sound granitic and igneous rocks in the target areas, quartzite, limestone and dolomite were identified on paper, but were not considered for evaluation during the initial field reconnaissance.

USGS geologic maps and USDA/NRCS soils maps were reviewed to prepare preliminary field sheets showing the location of potential sand and gravel resources that might be utilized for use as or processing into subballast. Prior to field reconnaissance, mapped soil units that were classified by the Soil Conservation Service (SCS) as having "probable" potential for construction aggregate sand and gravel were compared with the BLM (community free use and county) and

NDOT pit locations to develop a series of sites and general areas that might warrant further evaluation during the field reconnaissance.

3.0 FIELD RECONNAISSANCE

Preselected geologic and soil units identified from literature and data review as having the potential to supply railroad ballast and aggregate materials were visited by the field reconnaissance teams to make geologic observations, and to make preliminary assessments of site accessibility. The locations visited were generally within 10 miles of the MRC.

The initial field reconnaissance was conducted between 2 and 16 October 2006 by three teams. Field team MT1, comprised of Arthur Geldon (team leader) and Scott Pawling, started at the north end near Schurz/Wabuska and worked southward. Field team MT2, consisting of Bryan Keith Rauch (team leader) and Elizabeth Karcheski, started in the south end near Goldfield and worked northward. Field team MT3, comprised of William Laprade (team leader) and William Lewis, provided supervisory leadership to the field effort, provided training and support for GPS equipment, and performed geologic mapping for a short interval of the MN1 alignment. During these field reconnaissance efforts, the teams collected information on geology, landforms, geotechnical properties and issues (cut, fills, subsidence, and mines), ballast potential, and subballast potential.

S&W then analyzed the preliminary information for ballast quarries collected during the initial reconnaissance to select the sites that appeared to be feasible for development as ballast quarry sites for the MRC. At a meeting on 19 October 2006, S&W presented the attributes of 10 potential quarry sites (Plate 1) to a management team comprised of members of DOE, BSC, and NRP. Based on such factors as proximity to the proposed alignment, land status, strategic construction location, and anticipated available rock quantity, the meeting participants chose five sites for further study, including field sampling and laboratory testing.

Field team MT4 visited the five selected potential ballast source areas (Plate 1) to make additional geologic observations, assess site accessibility, and collect rock samples. Field team MT4 was composed of the same engineer and geologist as MT2. Field procedures were outlined in the scope of work and in a NVT Transportation Work Authorization for Fieldwork dated 25 September 2006.

No additional training or orientation was necessary for the field crew, because (1) the five sites had been visited during the initial geologic reconnaissance by teams MT1, MT2, and/or MT3 in late September and early October 2006, and (2) the MT4 team leader had performed similar ballast quarry field evaluations for the CRC in 2005. The site evaluations and sampling were carried out between 28 October and 3 November 2006. Samples of the five sites were delivered to Ninyo & Moore's laboratory in Las Vegas on 6 November 2006.

The quarry team required one to two days to complete an evaluation of a quarry area. The team consisted of a mining engineer and a geologist, the lead of which had 25 years of experience. They used Trimble GPS units connected to Archer hand-held computers using ArcPad 7.0 to track their locations and record waypoints of important features in the field. The field team recorded observations in a field book and on field forms created for this project. The completed Quarry Field Evaluation Checklists for each site are presented in Appendix A of the Ballast Quarry Report (Shannon & Wilson, 2007a). They include site observations, sketches, and photographs.

The S&W field team was accompanied throughout the ballast field evaluation and sampling process by Leroy Laurie, URS archaeologist. Mr. Laurie's purpose was to perform a preliminary assessment of each quarry site for the presence of cultural resources for the ballast quarry sampling process and to ensure that the sampling did not disturb cultural resources.

Additional work was authorized for (1) three alternative alignments near Schurz, Nevada, designated S4, S5, and S6; (2) MN3 near Goldfield, and (3) Thorne Yard near Hawthorne. Field team MT7, comprised of Bill Laprade and Scott Shimel, performed the reconnaissance of MN3 and Thorne Yard between 19 February 2007 and 23 February 2007. The reconnaissance of the three new alternative alignments at Schurz was completed by field team MT8 between 20 February 2007 and 7 March 2007.

Daily work activities were planned each evening. The field team informed the S&W Point-of-Contact (POC), Samuel Bernofsky, of the field team's itinerary for the next day. For the purpose of safety, before entering the field each day team members again contacted the POC, discussed the planned work activities, conducted and documented a pre-shift safety meeting, and inspected the vehicle, field equipment, safety equipment, and the other team members' physical and mental condition. Each evening the team contacted the POC, reviewed daily progress, reconciled field notes, and reviewed safety issues that came up in the course of the fieldwork. The observations and collected field data were backed up each day by making photocopies of field notebooks and downloading photographs into laptop computers. Soil and rock descriptions are based on Shannon & Wilson Field References – Soil and Rock Classification (Appendix B).

3.1 Ballast Sources

At each preselected potential ballast resource location, the team observed geologic and site characteristics, assessed site accessibility, collected samples, and photographed rock exposures. Global Positioning System (GPS) location coordinates were recorded for each field site visited.

Rock strengths were estimated from simple field tests, such as blows from a geologist's rock hammer and a Schmidt Hammer, at each potential resource site visited, because rock strength correlates with hardness, durability, and abrasion resistance. Other attributes such as density, porosity, oxidation, weathering, and presence or absence of undesirable mineralization, inclusions, fillings, vesicles, or voids were assessed visually and recorded in the field notes.

Characteristics of the overall rock mass that could affect quarrying were observed. These included the nature and geometry of structural discontinuities, bedding or flow thickness, continuity of beds or flows, and the presence of voids and solution cavities. Additional geologic characteristics the team noted included the presence of partings or seams of undesirable lithologic variations within the rock mass, such as scoria, flow breccias, and weak sedimentary interbeds.

Each potential ballast resource site visited was assessed for accessibility and potential quarry operational constraints. The distance in miles to existing dirt, gravel, and paved highways was noted, as well as the distance from the MRC. Required crossings of public roads and highways for haul-truck traffic were also noted. The available site size and general site layout and outcrop geometry were assessed in relation to quarry operation and excavation methodology. This included general observations of site topography, estimated mineable thickness of the potential ballast deposit based on surface exposures, and structural attitudes of discontinuities that could adversely impact quarry operations. In general, only rock exposures and outcrops that appeared from maps to have sufficient rock volume to provide the quantity of ballast required for the project were visited. Isolated and scattered small outcrops that did not appear to have the minimum volume of rock to meet project requirements were noted as such, but were not always visited because of time limitations.

Representative rock samples were collected from selected rock exposures at the five prospective ballast quarry areas. Rock samples were broken from outcrops, visually classified and described, and placed in cloth sample bags. A sample number was assigned and copied on the bag, in the field notes, and on the field map sheet at the sampling location. Upon conclusion of the ballast site field visits, the rock samples were transported to the Ninyo & Moore office in Las Vegas for testing and potential future shipping to other laboratories (Shannon & Wilson, 2007a).

3.2 Subballast Sources

For this project, subballast could potentially be produced from unconsolidated alluvial channel and fan deposits of sand and gravel along the alignment. Review of soils and geologic maps and literature indicated that these deposits occur over large areas in the vicinity of the proposed alignment, but they are well exposed only along stream channels and in existing borrow pits. Except where exposed, these deposits cannot be meaningfully observed. This made it impractical to visit discrete outcrops and exposures that might contain a potential resource, as was accomplished for potential ballast sources. Therefore, the purpose of the site reconnaissance was to develop a general understanding of the areas and geologic formations where deposits of sand and gravel suitable for processing into subballast, according to the criteria outlined in Section 5.1, were most likely to exist. The soil classification field references in Appendix B were used as a general guide for describing the soil.

During the field reconnaissance, existing sand and gravel pit borrow sources located along the MRC that were in use, had been used, or are intended for highway construction were field checked and compared with the descriptions in published USDA/NRCS soil surveys and in NDOT laboratory test results (Appendix A). The locations were also checked against the geologic formations assigned and depicted on published geologic maps. The results of field observations were later used to confirm a map of the soils judged to have the best potential for containing sand and gravel deposits suitable for use or processing into subballast along the MRC.

Exposures of sand and gravel deposits were observed and qualitatively evaluated for suitability for use as subballast. Attributes such as consistency, density, moisture content, structure, and cementation were also observed, including the presence and character of pedogenic calcium carbonate (caliche). Additional geologic characteristics noted included the presence of any seams or beds of undesirable fractions within the materials, such as clay, silt, and conglomeratic or bouldery mudflow deposits. The thickness and induration of pedogenic calcium-carbonate-cemented hardpans were also noted, as this impacts excavation and processing costs.

At each potential borrow source, the field teams made geologic observations and took photographs. GPS coordinates were recorded at the visited sites.

Ballast processing operations may also yield material suitable for use as subballast. With appropriate screening and further processing, this material could potentially be used for erosion control, road surfacing, and fill for embankment construction.

3.3 Other Construction Aggregate

No specific field reconnaissance was performed to identify other construction aggregate, such as embankment fill, and stone for erosion control (riprap). It is assumed that aggregate used as embankment fill and possibly riprap would be obtained from excavations for the roadbed and borrow pits located adjacent to the alignment. Riprap can also be obtained from the ballast quarries. Reuse of aggregate excavated during construction and the suitability of potential borrow sources are discussed in the Preliminary Geotechnical Report (Shannon & Wilson, 2007b).

3.4 Photographic Documentation

Photographs of the areas visited during the field reconnaissance were taken at selected sites. The frame index numbers were recorded in the field notes and with GPS coordinates. Photographs of the sites related to construction aggregates are included in Appendix C. A table listing photo ID, station and offset, waypoint number, date, and description of the subject is presented in the appendix. This table, along with the photos in JPG format, are contained on a CD included in the appendix. Appropriate photos can be viewed by clicking on the hyperlink in the table (MS-Excel). Locations of the waypoints where the photos were taken can be found in Figure 3 or Plate 1 of the Preliminary Geotechnical Report (Shannon & Wilson, 2007b).

4.0 POTENTIAL BALLAST SOURCES

4.1 Criteria for Ballast Sources

Ballast from natural rock sources is produced by crushing, screening, and, if required, washing quarried rock. As discussed in the Preliminary Geotechnical Design Criteria Manual (Shannon & Wilson, 2005b), aggregate gradations used as ballast range from a nominal maximum size (90 percent passing) of 2.5 to 1.5 inches to a nominal minimum size (10 percent passing) of 1.0 to 0.375 inch.

Ballast should meet the specifications outlined in the AREMA Manual (2007). Material property requirements include gradation, specific gravity, absorption, degradation, soundness, undesirable particles (clay lumps, friable, flat, elongated) and for some aggregate, chemical analysis. Recommended limiting values of testing for ballast property requirements are listed in Table 1. In general, it is not feasible to evaluate whether or not a particular ballast source rock will yield ballast conforming to AREMA specifications through visual observation of the source rock; rather, it is necessary to perform the specified laboratory tests.

In the absence of laboratory testing, the AREMA Manual (Chapter 1, Part 2, Section 2.2a) lists typical properties of acceptable ballast as follows:

- Ballast rock should be both hard and dense.
- The rock should have an angular particle structure that provides sharp corners and cubical fragments when crushed.
- The rock should be free of deleterious materials or inclusions.
- The rock should provide high resistance to temperature changes and chemical attack.
- The rock should have high electrical resistance, and low water-absorption properties.
- The rock should be free of cementing characteristics.
- The rock should have sufficient unit weight (pounds/cubic-foot), and have a limited amount of flat or elongated particles after processing.

Rock lithologies recommended by AREMA that commonly yield acceptable materials include granite, traprock (including basalt), quartzite, limestone, and dolomitic limestone. All of the natural rock types listed above occur within 10 miles of the alignment. In addition, blast and steel furnace slag or smelter slag, byproducts of industrial processes, can be processed into ballast. Although in the 19th and early 20th centuries, small smelters processing gold and silver ores operated in portions of central Nevada, slag in quantities sufficient to meet project requirements was neither observed during the field reconnaissance nor identified from the literature search.

Concrete ties produce greater crushing loads than wood ties; therefore, the AREMA Manual (Chapter 1, Part 2, Section 2.4.5) limits the use of concrete ties to ballast comprising granite, traprock, or quartzite. Limestone, dolomite, or slag ballast may be acceptable with concrete ties on lines with low axle loads or light traffic. For this project, it is anticipated that limestone, dolomite, and slag will not be used for ballast. Additionally, our experience from the CRC ballast quarry studies indicated that quartzite is brittle and has comminution problems under load.

4.2 Description of Potential Source Areas

The locations of potential natural rock ballast sources within the 20-mile-wide search area and centered on the MRC were compiled from the geologic literature review and plotted on a 1:250,000-scale map (Plate 1). Each potential source was prescreened to meet a combination of size and distance criteria; it had to be within 10 miles of the MRC and it had to be of sufficient size to yield an estimated 5 to 6 million tons of ballast.

4.2.1 Granite

Granite is a plutonic igneous rock consisting chiefly of quartz and feldspars. "Plutonic" refers to rocks that form at considerable depths in the earth's crust from a molten state (magma). Granites cool and crystallize very slowly deep beneath the earth's surface and develop a coarse crystalline "granitoid" texture. Eventually, the pluton may be uplifted and exposed at the earth's surface through erosion. Granitic rocks include granite, granodiorite, pegmatite, and quartz monzonite, among others. The literature review indicated 14 locations where granitic rocks were mapped at the surface within the search area. Three of these occurrences were selected for a site visit during the ballast quarry field reconnaissance. A photograph of a typical granitic rock ballast quarry site is shown in Figure 1.

4.2.2 Traprock

Traprock is a term used to describe any darker-colored, fine-grained, non-granitic igneous rock. This general definition includes basalt, dacite, rhyodacite, andesite, diorite, and diabase, all of which occur within the search area, but the only types of traprock considered for ballast in this study were basalt and andesite. Basalt was distinguished as a separate rock for reasons discussed in Section 4.2.3. Traprocks are formed by subaerial lava flows or from magma emplaced at shallow depths in the crust. The literature search indicated six locations where individually mappable units of traprock occurred at the surface within the search area. None of these occurrences was selected for a site visit during the ballast quarry field reconnaissance. The geologic maps showed some areas of andesite, rhyolite and dacite intermixed with other volcanic rocks. However, these were not included in the initial ballast reconnaissance because the geologic complexity of these sources, including the mixture of suitable with unsuitable rocks, makes them unlikely ballast sources.

4.2.3 Basalt

Basalt is a dark, fine-grained, extrusive igneous rock that forms at or just below the surface as volcanic lava flows and shallow intrusions. It generally cools very quickly and has a glassy to very fine-grained crystalline texture, often containing small, spherical voids (vesicles) formed by the expansion of gas or steam during the solidification of the rock. Basalt is considered a variety of "traprock" in the AREMA Manual, but is listed here separately from that category because of (a) its numerous occurrences, (b) the extremely wide variety of basalts found along the NRL, and (c) the general suitability of basalt for ballast compared to the other volcanic rocks along the project corridor. The literature search indicated nine locations where basalt occurs at the surface within the search area. Many of these locations included widely scattered small flows and isolated outcrops, some of which were grouped into one generalized "occurrence." Two of these occurrences were selected for a site visit during the ballast quarry field reconnaissance. A photograph of a typical basalt quarry site is presented on Figure 2.

4.2.4 Quartzite

Quartzite is a metamorphic rock consisting mainly of quartz formed through recrystallization of sandstone. Sandstone and other sedimentary rock buried deep in the earth's upper crust can undergo regional or contact-thermal metamorphism where heat and pressure cause recrystallization of silica to form an interlocked mosaic texture. Quartzite may also include unmetamorphosed sandstone where the entire rock mass has been cemented with secondary silica, such that the rock breaks across individual sand grains rather than around them. The literature search indicated no locations where quartzite occurred at the surface within the search area.

4.2.5 Carbonate Rocks

Carbonate rock is sedimentary rock that includes limestone and dolomite. Limestone is a chemical sediment formed by precipitation of calcium carbonate ($CaCO_3$) in aqueous environments, such as a deep ocean or carbonate-shelf environment. Dolomite is similar to limestone but has magnesium carbonate ($MgCO_3$) replacement of some of the original calcium carbonate. This change usually occurs through processes known as diagenetic alteration. Dolomites are defined as carbonate rocks with an $MgCO_3$ content of 36 percent or greater.

The literature search indicated five locations where carbonate rocks described above occurred at the surface within the search area. As discussed above, none of these occurrences was selected for a site visit during the ballast field reconnaissance. As mentioned in Section 4.1 of this report, limestone will not be used for ballast on this project. However, it may be suitable for erosion control stone, road surfacing, and fill for embankment construction.

4.2.6 Other Volcanic Rocks

Volcanic rocks other than basalt and traprock outcrop in the study area. These rocks include densely welded and non-welded ash-flow and ash-fall tuffs, rhyolitic lavas and intrusives, volcanic breccias, and complex areas of intermixed andesitic to rhyolitic lavas and intrusives. Although we observed numerous outcrops of densely welded ash-flow tuff and rhyolitic rock that appeared to have high strength, these rock types were not included in the field reconnaissances because they (a) are not listed in the AREMA Manual as typical ballast source rocks, (b) are often less uniform and more prone to inclusions of weak or weathered rock within a deposit, and (c) commonly do not meet the AREMA density requirements for ballast.

4.2.7 Summary

Geologic information obtained from published sources and field observations describing the 15 potential ballast source areas that were considered in the field are summarized on Table 2.

Table 2 contains geologic, resource, and physical site terrain descriptions of the potential source areas, as well as observed practical or economic aspects that either limit or enhance its suitability for providing ballast rock. Sampled source areas and a list of photographs (Appendix C) taken at each deposit are also listed on the table.

The quality of a potential ballast product is dependent on site-specific attributes of each deposit. Thus, a granite rock outcrop identified in the geologic literature search might be unsuitable for ballast because of weathering, alteration, or other factors that have destroyed the original integrity of the rock. A basalt flow may be so vesicular (full of air bubbles) that, although high in strength, it does not meet the required density for acceptable ballast. The potential ballast resources identified on Plate 1 were further evaluated for suitability based on geologic mapping, sampling, subsurface explorations, and laboratory testing.

Ballast sources that have favorable characteristics and were recommended for additional study are noted in Table 2. These resource sites were judged more favorable than others because of their combination of apparent acceptable rock quality, sufficient reserve volume, and site location attributes. Rock samples from these five potential ballast quarry sites were tested. The test results and a quarry rating table are presented in the Ballast Quarry Report (Shannon & Wilson, 2007a).

5.0 SUBBALLAST SOURCE AREAS

5.1 Criteria for Subballast

The AREMA Manual (2007) includes specifications for the characteristics and property requirements for acceptable subballast aggregate (Chapter 1, Part 2, Section 2.11.2.5). Subballast consists of a compacted granular material that lies between the track ballast and underlying subgrade soil. The subballast acts as a filter to prevent subgrade soil from penetrating up into the ballast section, while at the same time allowing water to drain from the ballast. The AREMA Manual recommends that subballast meet filter criteria for the subgrade soils (Table 3). Therefore, the gradation of the subballast is dependent upon the gradation of the soils used to construct roadbed embankments.

In addition to the AREMA filter criteria, we recommend that subballast contain no more than 5 percent fines (percentage by weight of the minus ¾-inch soil fraction passing the No. 200 sieve during wet-sieving) regardless of the filter design results (Shannon & Wilson, 2005b). In addition, the fines should be non-plastic. For those portions of the corridor at higher elevations where freezing and thawing conditions might be encountered, subballast should be non-frost-susceptible (must contain less than 3 percent by weight of the minus ¾-inch soil fraction smaller than 0.02 millimeter (mm) during wet sieving).

Sources of subballast include crushed stone, natural or crushed gravel, natural or processed sand, slag, or mixtures of these materials. For this project, the most likely source of subballast includes screened material from ballast processing and natural or processed soils located on or adjacent to the alignment. To a great extent, the cost of transportation of subballast and the availability of water would determine which aggregate source is ultimately selected. For example, it may be more cost-effective to wash and screen locally derived, naturally occurring soils adjacent to the alignment to obtain the proper gradation rather than to transport naturally occurring aggregate with the proper gradation over long distances. NRP has stated that subballast sources should ideally be located no farther than 10 miles apart along and no more than about one-quarter mile from the railroad alignment. Measures necessary to meet subballast design criteria would depend on the material characteristics at each source. Future work could be targeted at identifying sources with less than 5 percent fines to reduce the need for washing.

5.2 Description of Potential Source Areas

To identify potential subballast source areas, we identified geologic units that might contain sand and gravel deposits suitable for use or processing into subballast. Since these formations cover very large areas and can range widely in grain-size characteristics, we reviewed existing soil databases for indications of location and the distribution of soil deposits that could be processed into subballast. We also obtained from NDOT the locations of its existing borrow pits and/or leases for borrow pits where the proposed railroad alignment and state highways were proximal. A photograph of a typical NDOT borrow pit is presented on Figure 3. Figure 4 shows NDOT borrow pit ES 02-11 near Lone Mountain during active operation. Additionally, we procured the locations of existing private and other public sand and gravel extraction operations; shown on Plates 2 and 3.

We understand that NRP desires to have aggregate borrow sources every 10 miles along the proposed rail corridor. The principal parts of a source site would include a borrow pit, spoil stockpile, processing/production area, subballast/aggregate stockpile, settling ponds, power generation unit, scales, and connecting access/haul roads. Water wells may be developed for material washing at some sites (Barksdale, 1991). A drawing showing a conceptual layout of these components is presented in Figure 5.

5.2.1 Geology of Potential Subballast Resources

Geologic deposits that have high potential to be a source of suitable subballast within the search area include several types of unconsolidated alluvium. Alluvium of both the Quaternary and Tertiary Age constitutes the majority of the geologic materials underlying the MRC; therefore, soil deposits that have the potential for yielding subballast aggregate occur through much of the corridor. Most are alluvial fan deposits that are coarse grained near the mountain front and become finer with increasing distance from the mountains. Soils developed in the alluvium are mapped and described by the USDA/NRCS for all of the alignment. Although geologic maps for much of the CRC differentiated types of alluvium, the county geologic maps used for the MRC did not differentiate them. Therefore, the USDA/NRCS maps and data were used for subballast evaluation on the MRC.

Alluvial deposits determined to be suitable for subballast sources are described in the following sections, from most favorable to least favorable. The terms used in this section of the report can be found and are described in the Preliminary Geotechnical Report (Shannon & Wilson, 2007b). S&W field geologists attempted to make distinctions among the alluvial deposits in the field, where possible.

5.2.2 Channel Alluvium

Channel alluvium consists of very young gravel, sand, and silt deposits in active or very recent streambeds along the valley floors of major drainages. Channel alluvium is generally loose, unweathered, and typically is 3 to 30 feet thick. Some drainages may consist of braided channels or streambeds interspersed with areas of older alluvium. A photograph of an exposure of channel alluvium is presented on Figure 6.

5.2.3 Young Alluvium

Young alluvium is mostly medium to coarse-grained stream deposits consisting of Quaternary boulders, cobbles, gravel, and sand. A photograph of sandy young alluvium is presented on Figure 7. Typically, the alluvial fans are very coarse near the mountain fronts, but transition to finer materials toward the middles of the basins, which contain deposits of fine-grained sand, silt and clay. These fine-grained soils can be found locally even in the higher parts of the fans. The deposits are commonly loose to medium dense. There is typically no (or very weak) soil development, incipient development of surface desert pavement, and only minor dissection of the deposits by erosion. The literature reports variable thicknesses, from 3 to 60 feet, and possibly as thick as 90 feet near tectonically active highlands (Lattman, 1973).

An atypical situation occurs at the proposed Thorne yard where young alluvium (Qay) consisting of debris flow angular sandy gravel is interbedded with Late Pleistocene lake bed (Ql) silt and sand. This relationship is depicted in Figure 8. Whereas the silt and sand may not be suitable for use as subballast, the gravel layers, where they are of sufficient thickness and lateral continuity to be segregated, are likely to be suitable for use as subballast.

5.2.4 Old Alluvium

Old alluvium deposits typically consist of older Quaternary-aged, medium to coarse-grained gravel and sand in dissected older alluvial fans in proximal and mid–basin positions. A photograph of typical old alluvium is shown in Figure 9. The deposits are variably indurated, loose to dense and lie below potentially well-cemented, poorly to well-developed calcic to petrocalcic soil horizons (caliche hardpans), as shown in Figure 10. The deposits are moderately to deeply dissected, moderately weathered, and have moderate to well-developed desert pavements. They are typically from a few feet to 90 feet thick, but may be as thick as 300 feet in some areas, and may underlie basins to depths of 1,500 feet or more. In some places, the upper parts of some old alluvial deposits may not be suitable as subballast sources because of a large percentage of disintegrated, weathered, gravel clasts.

5.2.5 Older Gravels

These deposits consist of the oldest alluvial gravel deposits in upland areas, usually well above the active drainage system. They range in age from early Quaternary to Tertiary. The deposits are highly weathered, highly dissected, and contain well-developed soils with thick pedogenic-calcrete hardpans and well-developed desert pavements. The deposits generally consist of medium to coarse-grained gravel and sand, with variable induration from poorly consolidated beneath cemented surface soils to well-cemented throughout. Thicknesses range from a few feet to 300 feet, with the literature reporting local thicknesses to 900 feet or more. The upper parts of these deposits are generally not suitable as subballast sources because of the large percentage of disintegrated, weathered gravel clasts, and a high calcium carbonate (caliche) content. Calcium carbonate generally forms continuous, thick coatings on gravel clasts and permeates the finer-grained matrix of these older deposits. If significant quantities of calcium carbonate are present, these materials should not be used as subballast.

5.3 Soil Database Search Results

To narrow the search area and to assess the occurrence of suitable soil deposits that could be used for or processed into subballast, we performed a search of soils data obtained from the USDA/NRCS. The USDA/NRCS maintains a nationwide database of soil survey information in the Soil Survey Geographic Database (SSURGO Version 2.2). This database is organized by state, county, and soil area within each county. Tabular data available for each soil area includes soil layers, layer thicknesses, soil classifications and texture descriptions, and grain size distribution ranges. Spatial data defining the extents of related map units with similar attributes, described above, are also available in common GIS formats. The SSURGO database template and tabular data were downloaded in Microsoft Access™ format and the spatial data were downloaded in ESRI ArcView shapefile format from the USDA/NRCS Soil Data Mart web site http://soildatamart.nrcs.usda.gov/.

Data from the following areas, covering most of the Mina Rail Corridor, were downloaded.

Area Symbol	Area Name
NV770	Churchill County Area, Nevada, Parts of Churchill and Lyon Counties
NV796	Esmeralda County Area, Nevada
NV799	Hawthorne Ammunition Plant, Nevada, Part of Mineral County
NV625	Lyon County Area, Nevada
NV774	Mineral County Area, Nevada

In our opinion, soils suitable for use or processing into subballast are typically well-graded sands and gravels with not more that 12 percent fines by weight. These soils would classify as SW, SW-SM, GW, and GW-GM according to the Unified Soil Classification System (USCS) categories of coarse-grained soils as shown in Table 4. Crushing of oversize material, screening, mixing, and, if required, washing may be required to produce suitable subballast from poorly graded and high-fines-content sands and gravels.

The criteria used to select candidate soil survey areas for future surface exploration for subballast deposits were: (1) proximity to the MRC and (2) likelihood of finding suitable sands or gravels in these areas. Proximity to the MRC was defined as being any soil survey area in the SSURGO database that was intersected by the rail alignment. The likelihood of finding suitable sand or gravel in the proximate areas was evaluated by primarily reviewing the USCS soil classifications, soil grain-size distributions, and soil layer thicknesses of the data in the SSURGO database.

Data in the SSURGO database are stored in related hierarchical tables, the top-level table storing attributes related to the spatially defined map units. These soil map units are made up of components which are in turn composed of horizons, or layers. Properties of soil layers, such as thickness and grain size distribution ranges, are stored in this horizon table, while other properties, such as USCS classification and textural descriptions, are stored in related tables to allow for multiple entries per layer. The depth of these layers is limited to the upper 60 inches, or 5 feet, of the soil profile. Criteria for identifying those soils that could be suitable for use as subballast included the following:

- Soil layers that include USCS classifications of SW and SW-SM for potential sand sources, and GW and GW-GM for potential gravel sources.
- Soil layers whose bottom depth is recorded at the maximum depth of 5 feet, indicating the thickness of the layer is likely greater than recorded, or soil layers whose top depth is at least one foot (to filter out potentially organic soils or soils with higher fines content) and whose thickness exceeds two feet.

Based on the criteria described above, map unit areas that have components that in turn have soil layers that meet these criteria were identified and are displayed graphically on Plates 2 and 3, Potential Construction Aggregate Source Areas for sand and gravel, respectively. The map unit areas shown on these plates are further subdivided by USCS classification: SW (well-graded sand) and SW-SM (well-graded sand with silt or with silt and gravel) on Plate 2, and GW (well-graded gravel) and GW-GM (well-graded gravel with silt or with silt and sand) on Plate 3. Those soils classified as SW or GW would be better candidates for use as subballast, than those classified as SW-SM or GW-GM, as they contain less than 5 percent fines, making them less sensitive to changes in moisture and are, in most circumstances, more pervious.

The candidate areas shown on the plates are also summarized on Table 5 for sand deposits and Table 6 for gravel deposits for those map unit areas intersected by the rail alignment. Attributes of the map units, components, and horizons within the table are organized by alignment segment and station. The tables present the relative percentage of map unit components that contain horizons, or soil layers, that meet the defined criteria for potential use as subballast. The tables also present the thicknesses of the horizons, whether the horizons are at the maximum depth (5 feet) of the recorded data, and their USCS classifications and texture descriptions. As shown in the tables, there can be multiple classifications and descriptions for a single horizon, so the grain size, and subsequently the suitability for use as subballast, could vary significantly.

Areas along the MRC that are likely candidates for future subsurface exploration for sand vary in quality. Only about three miles of the rail alignment are adjacent to map unit areas that contain soils classified as well-graded sands (SW), while 110 miles of the rail alignment are adjacent to map units areas that contain soils classified as well-graded sands with silt or with silt and gravel (SW-SM). The range of the grain size distributions of the potential sand sources was evaluated by reviewing the grain size summaries in the SSURGO database and is shown in Figure 11. For comparison purposes, a typical subballast gradation is shown in Figure 11. Specific subballast criteria for the NRL will depend on field conditions and design criteria. The finer-grained sands may not produce suitable subballast. In addition, the sand may require washing to remove fines and screening to remove cobbles to make it suitable for use as subballast. Sand that is not suitable for use as subballast may be suitable for use as embankment fill.

Map unit areas that are likely candidates for future subsurface exploration for gravel are more abundant. Approximately 133 miles of the rail alignment are adjacent to map unit areas that contain soils classified as well-graded gravels (GW), while 33 miles of the rail alignment are adjacent to map units areas that contain soils classified as well-graded gravels with silt or with silt and sand (GW-GM). The range of the grain size distributions of the potential gravel sources was evaluated by reviewing the grain size summaries in the SSURGO database and is shown in Figure 12. For comparison purposes, a typical subballast gradation is shown in Figure 12. The grain size of the gravels in the candidate areas is coarser than is generally used for subballast. These gravels may require screening or crushing of cobbles or large rock fragments and washing to remove fines to make it suitable for use as subballast.

The criteria were limited to select candidate soil survey areas for future surface exploration for subballast sands and gravels to those areas adjacent to the MRC. Should future subsurface explorations indicate that there are insufficient quantities of suitable subballast aggregate in the candidate areas, it may be necessary to expand the search area in subsequent studies.

6.0 EMBANKMENT FILL

It is assumed that embankments for the roadbed would be constructed from soil and rock excavated from either railroad alignment cuts or borrow pits located adjacent to the alignment. Evaluation of soil and rock located along the alignment for use as embankment fill is discussed in the Preliminary Geotechnical Report (Shannon & Wilson, 2007b). The report concluded that most of the excavated soil and rock could be utilized as embankment fill either with or without treatment or processing, although moisture control would likely be necessary.

7.0 STONE FOR EROSION CONTROL

7.1 Criteria for Erosion Control Stone (Riprap)

The AREMA Manual (Chapter 1, Part 3, Section 3.4) cites U.S. Army Corps of Engineers (USACE) design manuals for design of riprap protection of structures. USACE design guidelines (USACE, 1990 and 1994) require that the stone should be durable, sound, and free from detrimental cracks, seams, and other defects. The stone should be resistant to localized weathering and disintegration from environmental effects such as freeze-thaw cracking. Laboratory tests are recommended where appropriate and may include petrography, unit-weight determination, absorption, sulfate soundness, glycol soundness, abrasion, freeze-thaw resistance, and drop tests. In practice, erosion-control stone is often selected on past satisfactory performance and visual evaluation. For a rock source where past performance data is not available, quarried stone may be set aside for a minimum of one season to evaluate resistance to weathering and freeze-thaw cycles.

In addition to USACE guidelines, the American Society for Testing and Materials (ASTM) Standard D 6092, "Standard Practice for Specifying Standard Sizes of Stone for Erosion Control," describes the characteristics and property requirements for acceptable riprap. The described characteristics and properties are similar to those specified by the USACE.

Gradations for stone sizes depend on intended use and are usually based on the weight of individual stone particles. Dimensions of stone particles are typically on the order of 6 inches to 3 feet. Rock types that potentially yield riprap with desirable properties and characteristics include granite, quartzite, basalt, limestone, dolomite, rhyolite, dacite, andesite, sandstone, breccia, and conglomerate; however, granite, basalt, and andesite are most likely to be suitable along the MRC. All of these rock types occur along or in relatively close proximity to the rail alignment.

7.2 Description of Potential Source Areas

Rock suitable for use as erosion-control stone (riprap) was observed along many sections of the MRC. Recommended riprap criteria are less restrictive than ballast criteria; therefore, more rock types qualify as suitable for erosion-control use.

Riprap is available from two general sources of rock: (1) hard, durable rock obtained from excavations made for roadbed construction, and (2) riprap obtained from any of the identified potential ballast sources listed on Table 2 that were field visited. Erosion control materials are likely to come from a combination of these sources. However, only five of the potential ballast quarry sites were sampled and tested. Rock cuts may have surplus rock that can also be used locally as erosion protection. Long sections of track across alluvial fans and basins may need to have riprap hauled in from excavations or from ballast quarry sites established along the alignment.

7.2.1 Excavated Rock

In general, hard, durable rock that requires drilling and blasting to excavate may be suitable as local erosion-control stone. Suitable rock types include densely welded volcanic tuffs, lavas of several lithologies, and hard limestone, quartzite, and dolomite formations. At many excavation locations, such as Clayton Pass, North Clayton (small part), South Montezuma

Pass (metamorphics only), The Crater and the Terrill Mountains, these rock types may meet riprap criteria, but should be evaluated further during future studies.

Exceptions to the use of excavated rock-cut stone as riprap in the above-listed rock types include (a) soft, friable, poorly welded tuffs, (b) fissile-bedded or flow-banded lavas, and (c) weak or poorly indurated sandstone and conglomerate. Such rocks were observed in the Tonopah Junction, western Weepah Hills, South Montezuma Pass (volcanics only), northern edge of Garfield Hills, Candelaria Hills, Calico Hills, Painted Mesa and parts of the Terrill Mountains. In addition, hydrothermal alteration and associated mineralization render rock soft and/or mineralogically unsuitable for riprap. Rock unsuitable for use as riprap because of hydrothermal alteration potentially includes excavated material from many of the volcanic rocks in the Goldfield Hills. The alteration may not always be apparent at the ground surface.

There are also local cut-sections of shale and thin-bedded clastic and carbonate rocks that most likely would not produce rock that would satisfy criteria for riprap. Those were encountered in the North Clayton hill area, south Clayton Valley, northeastern Walker River Valley, and southern end of the Goldfield Hills.

7.2.2 Ballast Rock Resources

A second source of erosion-control stone is quarries established for ballast. Rock that is sufficiently hard and durable for ballast is also suitable for use as riprap, assuming that the spacing of discontinuities is large enough to produce larger rocks. Since riprap gradations typically range from 6 inches to 3 feet in diameter, riprap could be produced from zones of widely jointed rock in ballast quarries.

8.0 AGGREGATE FOR CONCRETE

8.1 Criteria for Concrete Aggregate

The AREMA Manual (Chapter 8, Section 1.4) specifies the characteristics and property requirements for acceptable concrete aggregate. Concrete aggregate should also generally conform to the requirements of ASTM C 33 "Standard Specifications for Concrete Aggregates."

Concrete aggregate consists of natural sand and gravel, or crushed rock when suitable natural deposits are not available. Suitable aggregate is composed of clean, uncoated, properly shaped particles of strong, durable materials that are resistant to chemical or physical changes.

Aggregate should be free of silt, clay, mica, coal, organic matter, chemical salts, and surface coatings to avoid decreased strength and durability. In order for aggregate to resist the influences of weathering, mineral or rock particles that are physically weak, absorptive, easily cleavable, or that swell when saturated, are to be avoided.

Chemically reactive aggregate can cause premature deterioration of concrete. A reaction can occur between the reactive aggregate and the alkalis in the cement. Lithologies containing known reactive substances such as chalcedony, silica minerals, and opal would not be suitable for use as concrete aggregate. Although pure limestones and dolomites are not deleteriously reactive, they could contain opal and chalcedony that could result in alkali-aggregate reactivity.

Aggregate in concrete makes up from 70 to well over 80 percent of the total solid volume of the mix. The particle-size distribution of aggregate is determined by a typical range between ¾ inch and No. 100 sieves. For walls and other structures where smooth surfaces are desired, the fine aggregate should be graded so that not less than 15 percent would pass the No. 50 sieve, and not less than 3 percent would pass the No. 100 sieve, with no aggregate larger than 2½ inches (to facilitate pumping). Mixes having more coarse aggregate require less water and less cement per cubic yard than do mixes with less coarse aggregate. However, compressive strength varies inversely with maximum size of aggregate.

Usually, any potable water is suitable as mixing water for concrete. Under certain conditions, acceptable non-potable water could be used. However, mixing water should not contain an excessive amount of silt or suspended solids. A turbidity limit of 2,000 parts per million (ppm) is a reasonable maximum. Proposed water containing sulfates should be analyzed. A concentration of up to 3,000 ppm of dissolved sulfates has been shown to have no detrimental effect when used for mixing or curing (U.S. Bureau of Reclamation, 1975).

8.2 Description of Potential Source Areas

The reconnaissance fieldwork focused on areas identified in the literature search as having a high potential for natural sand and gravel, similar to subballast resources (refer to Section 5.2), AREMA recommended-criteria for concrete aggregate. The criteria for aggregate suitable for use in concrete is far more restrictive than natural sand and gravel used for subballast. In particular, coarse concrete aggregate must have a very high percentage of durable particles that are free from adherent coatings. As described above in Section 5.2, Old Alluvium and Older Gravel deposits are less likely to be suitable sources of concrete aggregate because of their higher content of weathered, rotted gravel clasts, and the pervasive pedogenic, calcium-carbonate clast coatings characteristic of these deposits. The potential for alluvial gravel-sourced concrete aggregates in the Mina Corridor is therefore probably restricted to deposits of Channel Alluvium and Young Alluvium.

A new quarry could also be developed along the MRC as a source of crushed rock. We anticipate that crushed rock produced from many of the potential igneous-rock ballast sources identified within the search area would likely be suitable as coarse concrete aggregate. There are undoubtedly exceptions, and laboratory testing, as presented in the referenced standards, is recommended during subsequent studies to determine if selected ballast sources also meet concrete aggregate criteria.

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 Ballast Sources

Potentially exploitable ballast sources were identified throughout the search area. Five of the 15 source areas listed in the literature search (Table 2) appeared to warrant sampling and testing. The testing was completed and all five sites were deemed suitable for further consideration (Shannon & Wilson, 2007a). A summary of the five sites is presented in Table 7.

Once a construction staging area and construction sequencing are determined, ballast sources identified in the Ballast Quarry Report (Shannon & Wilson, 2007a) that are near the designated construction staging area could be investigated in more detail. Additional geotechnical work recommended for characterizing and selecting a potential ballast source for development would include:

- Detailed outcrop mapping
- Selection of specific drilling locations and equipment
- Exploratory core drilling

- Laboratory testing of the cores retrieved from the exploratory borings
- Geophysical exploration to correlate conditions between borings, where necessary

Rock quality and quantity, land status, site layout, and mineability of the deposit would ultimately determine the best quarry location(s) for the project.

The evaluation of five potential ballast quarry sites is described in more detail in the Ballast Quarry Report (Shannon & Wilson, Inc. 2007a).

9.2 Subballast Recommendations

Field reconnaissance indicates a high likelihood of finding suitable sand and gravel for subballast throughout most of the search area. Most of the MRC crosses expanses of alluvial sand and gravel deposits expected to be suitable for construction use. We expect that borrow sites in these deposits can be opened at selected locations on or very close to the alignment, largely based on the cost of processing and transporting subballast. For about 72 miles, the MRC is parallel to and within about one mile of US 95, along which NDOT has existing (and in many cases, barely used) permitted borrow pits. Based on our field observations, literature research, and NDOT laboratory testing results (Appendix A), natural materials will need to be screened, mixed, and possibly washed in order to obtain suitable subballast. Figures 11 and 12 can be used in conceptual level studies to estimate approximate volumes of aggregate that would need to be screened and, if appropriate, washed. In addition, where the embankment fill approximates the gradations shown in Figures 11 and 12, it may not be necessary to transport and place a separate subballast layer.

Recommendations for further characterization of potential construction aggregate material deposits in future studies could include:

- Use results of future, detailed mapping, sampling, and geotechnical soils analysis on the alignment to further refine areas of higher quality construction and subballast aggregate. Bulk samples of borrow materials can be collected to determine percentages of the various size fractions for target deposits and to help develop processing requirements.
- Use high resolution aerial photography of the alignment to map deposits of potential construction aggregate adjacent to or very near the alignment. Aerial photography coupled with subsurface exploration (borings and test pits) conducted in future studies may provide better delineation of potential sand and gravel sources through correlation of soil types with drainage density, vegetation associations, texture and color on the photos.

- If appropriate, geophysics can be used to help define depths and qualitative attributes of potential construction aggregate for large areas along the alignment.
- Preliminary excavation with backhoe test pits for embankment preparation could be used to map, sample, and confirm suitable construction aggregate sources.
- Availability of water may factor into the preferred location of construction aggregate processing areas. Water resource availability should be investigated further during future characterization work in relation to construction aggregate processing.

Because there are few, if any, existing borrow pits at the southern end of Clayton Valley, the northern end of Walker Valley, and much of the first 10 miles east of Thorne, subsurface explorations would be required to preliminarily characterize the potentially available sand and gravel resource there. This study indicates that the availability of suitable sand and gravel deposits for use as or processing into subballast may be limited in these areas. These efforts should include an evaluation of areal photographs, a field reconnaissance, and a review of land status.

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TABLE 1
RECOMMENDED LIMITING VALUES OF TESTING FOR RAILROAD BALLAST

Rock-Sourced Ballast Material[1]						
Property	**Granite**	**Traprock and Basalt**	**Quartzite**	**Limestone**	**Dolomite**	**ASTM Test**
Fines Content (percent material passing No. 200 sieve)	<1.0%	<1.0%	<1.0%	<1.0%	<1.0%	C 117
Bulk Specific Gravity	>2.60	>2.60	>2.60	>2.60	>2.65	C 127
Absorption Percent	<1.0	<1.0	<1.0	<2.0	<2.0	C 127
Clay Lumps and Friable Particles	<0.5%	<0.5%	<0.5%	<0.5%	<0.5%	C 142
Degradation[2]	<35%	<25%	<30%	<30%	<30%	[3]
Soundness (Sodium Sulfate) 5 Cycles	<5.0%	<5.0%	<5.0%	>5.0%	<5.0%	C 88
Flat or Elongated Particles	<5.0%	<5.0%	<5.0%	<5.0%	<5.0%	D 4791

Notes:
[1] The limit for bulk specific gravity is a minimum value. Limits for other tests are maximum values.
[2] Also known as "Los Angeles Abrasion Test"
[3] Materials having gradations containing particles retained on the 1-inch sieve shall be tested by ASTM C 535. Materials having a gradation with 100% passing the 1-inch sieve shall be tested by ASTM C 131.

TABLE 2
POTENTIAL BALLAST SOURCE AREAS

MAP ID NO.	ROCK TYPE	GEOGRAPHIC AREA/ LOCATION	MILES FROM ALIGNMENT	PUBLISHED DESCRIPTION (SOURCE)	FIELD VISIT/ SAMPLED	FINAL CANDIDATE	PHOTO NO.	GEOLOGIC RESOURCES ASPECTS	PHYSICAL AND TERRAIN CHARACTERISTICS	COMMENTS
Malpais Mesa South	BASALT	Extensive outcrops and multiple flows on south end of mesa	2 to 3	Malpais Basalt and Rabbit Spring Formation (Albers and Stewart, 1972)	Y/Y	Y	MT4006_BKR_0161-28Oct06 to MT4006_BKR_0163_28Oct06	BASALT: Moderate to high strength, gray, fine crystalline; massive, locally highly vesicular with 10-90 percent zeolite filled vesicles, jointed; fresh to slightly weathered.	Extensive outcrop; excellent mining characteristics; fair access; minimal visual impact from Goldfield and US 95.	May require conveyor system to move rock from quarry to plant to siding with reasonable speed; deposit could produce about 13 million tons rock.
North Clayton	GRANITE	North end of Clayton Ridge; adjacent to power line that runs south from Alkali Spring	0 to 1	Coarse-grained granitic rocks--Mainly granite but includes some granodiorite and monzonite. Also includes pegmatitic material in Mineral Ridge area (Albers and Stewart, 1972)	Y/Y	Y	MT4007_BKR_0164_28Oct06 to MT4007_BKR_0166_28Oct06 and MT3038_WTL_0212_09Oct06 to MT3038_WTL_0214_09Oct06	GRANITE: high strength, coarse crystalline; closely to widely jointed.	Large sized outcrop; very close to alignment; with good access; minimal visual impact; moderate to steep topography in quarry area	Immediate proximity to Alignment MN1 and good quality rock in pluton; could produce about 14 million tons rock.
Gabbs Range	GRANITE	Outcrops on the west slope of the Gabbs Valley Range, adjacent to the Soda Spring Valley.	0 to 1	Granitic rocks--Chiefly granite, lesser granodiorite; albite granite and related rocks locally (Data furnished by Ferguson, H.G.., et al, revised in part by Ross and Kleinhampl)	Y/Y	Y	MT4008_BKR_0167_31Oct06 to MT4008_BKR_0174_31Oct06	GRANITE: high strength, coarse crystalline; close-spaced joints; altered zones at both ends of outcrop may limit size of quarry	Processing operations would be visible from US 95 and Luning; steep topography may be difficult for mining; close-spaced joints may create excessive fines	Deposit could produce up to about 14 million tons rock.
Garfield Hills	BASALT	About 8.8 miles east of Hawthorne and south of US 95; situated on the north slope of the Garfield Hills.	1 to 2	Mafic Volcanic Rocks--Chiefly Quaternary flows that are in part trachybasalt and latite (Ferguson, et al, 1954)	Y/Y	Y	MT4009_BKR_0177_02Nov06 to MT4009_BKR_0183_02Nov06 and MT1013_WTL_0056_05Oct06 to MT1013_WTL_0059_05Oct06	BASALT: a dark, fine-grained extrusive igneous rock; The vesicles in this outcrop are most often filled with zeolite crystals and are more numerous near the top of each flow.	Extensive outcrop; multiple basalt flows with altered scoriaceous and rubbley zones between flows; scoria occasionally extends vertically through the basalt flows; scoria zones are not suitable for ballast material (high internal waste); outcrop is moderately jointed and fractured; processing operations would be visible from US 95	Deposit could produce up to 42 million tons rock. Existing public access road passes through Hawthorne Ammunition Depot property and siding is on depot.
Weber Dam Quarry	GRANITE	Extensive outcrops at north end of White Mountain	1 to 2	Granitic rocks--Chiefly quartz monzonite, lesser granodiorite; albite granite and related rocks locally (Data furnished by Ferguson, H.G., et al, revised in part by Ross and Kleinhampl)	Y/Y	Y	MT4010_BKR_0184_03Nov06 to MT4010_BKR_0188_03Nov06 and MT3024_WTL_0082_06Oct06 to MT3024_WTL_0085_06Oct06	GRANITE: very high strength, coarse crystalline; multiple thin shear zones - thickness varies from 1 inch to 1 foot; pegmatitic dikes range from a few inches to 2 feet in thickness - pegmatites contain feldspar, quartz, and micas; they do not appear to significantly weaken the rock	Steep topography may make mining difficult; close-spaced jointing may lead to excessive undersized fraction during blasting, crushing and screening; processing operation would be adjacent to and visible from US 95A; all facilities on Walker River Paiute Reservation	Large outcrop of high strength material; site may contain cultural resources (lithic fragments); deposit could produce about 18 million tons rock.
The Crater	BASALT	On alignment at south end of Big Smoky Valley/north side of Clayton Valley	0	Basalt, (Albers and Stewart, 1972)	Y/N	N	NoWaypt_WTL_0165_08Oct06 and MT2041_WTL_0166_08Oct06 to MT2041_WTL_0171_08Oct06	BASALT: lava flow; high strength rock, but unsuitable zones of rubble and air fall volcanics; limited volume, about 40 feet thick.	Limited volume, incidental to excavation for RR alignment, 1/2 mile off paved road.	Could be also be used as common embankment fill or subballast in Clayton Valley, to south The Crater
Lone Mountain	QUARTZ MONZONITE	Extensive and thick outcrop south and east of Big Smoky Valley between MN1 and MN2 alignments	5 to 7	Coarse-grained granitic rocks--Mainly biotite quartz monzonite but includes some granodiorite and monzonite. Also includes pegmatitic material in Mineral Ridge area (Albers and Stewart, 1972, and Stewart et al., 1994)	Y/N	N	MT2018_WTL_0090_07Oct06 to MT2018_WTL_0094_07Oct06	QUARTZ MONZONITE: high strength, extensive outcrop.	Extensive outcrop; on dirt road, 5 miles from US 95. Quarry site and processing operations visible from US 95. Steep to property.	Extensive outcrop of high strength material.
Weepah Hills	QUARTZ MONZONITE	Extensive outcrop east of Big Smoky Valley between north and south alignments SW of Lone Mountain	5 to 6	Coarse-grained granitic rocks--Mainly biotite quartz monzonite but includes some granodiorite and monzonite. Also includes pegmatitic material in Mineral Ridge area (Albers and Stewart, 1972)	Y/N	N	MT2034_WTL_0127_07Oct06 to MT2034_WTL_0130_07Oct06 and MT2038_BKR_0044_07Oct06	QUARTZ MONZONITE: high strength, extensive outcrop.	Extensive outcrop; existing gravel road.	Extensive outcrop of high strength material. Park-like setting in canyon with extensive outcropping of granitic rock. Very large pluton, steep side slopes and deep canyons.
Candelaria Hills	ANDESITE	West side of alignment adjacent to Soda Spring Valley, south of Excelsior Mountains	12 to 13	Two 20 to 30-foot thick andesite flows separated by ash-flow tuff/sedimentary rocks (Ferguson et al., 1954, and Speed and Cogbill, 1979)	Y/N	N	MT1078_ALG_0242_12Oct06 to MT1078_ALG_0247_12Oct06	ANDESITE: high strength, easy access from paved road. Ash-flow tuff between lava flows would have to be separated and wasted.	Easy access from paved road.	Flows over wide area, high strength, easy access from paved road. Long distance from alignment compared with other quarry sites, other parts of formation closer to MRC.
Gillis Range	QUARTZ MONZONITE	On Walker River Indian Reservation, east of Walker Lake	3 to 5	Granitic rocks--Chiefly quartz monzonite, lesser granodiorite; albite granite and related rocks locally (Hardyman, 1980)	Y/N	N	MT1047_ALG_0129_09Oct06 to MT1047_ALG_0134_09Oct06	QUARTZ MONZONITE: high strength, extensive exposure. Scattered thin rhyolite dikes.	Rolling topography. Access from existing gravel road.	Medium to very widely spaced jointing. Distant haul to new alignment. On Walker River Paiute reservation.
Monte Cristo Range	ANDESITE	North of alignment, approximately 2 miles NE of Coaldale	3 to 5	Gilbert Andesite--An apparent anomalously old date of 15.1 m.y. was obtained from the Gilbert Andesite (Ferguson et al., 1953; and Stewart et al.,1994))	N/N	N	MT1086_ALG_0275_13Oct06 and MT1086_ALG_0276_13Oct06	PORPHYRITIC ANDESITE: with subordinate tuff breccia, lahars and intrusives	Abrupt mountain face, and narrow valleys.	Cap of andesite over weak volcanic rocks. Viewed from alluvial fan. Observed tuff and lahar layers make ballast quarrying impractical.

MAP ID NO.	ROCK TYPE	GEOGRAPHIC AREA/ LOCATION	MILES FROM ALIGNMENT	PUBLISHED DESCRIPTION (SOURCE)	FIELD VISIT/ SAMPLED	FINAL CANDIDATE	PHOTO NO.	GEOLOGIC RESOURCES ASPECTS	PHYSICAL AND TERRAIN CHARACTERISTICS	COMMENTS
Wassuk Range South	QUARTZ MONZONITE, GRANODIORITE, GRANITE	North end of Wassuk Range, west of alignment	15 to 20	Granitic rocks--Chiefly quartz monzonite, lesser granodiorite; albite granite and related rocks locally (Stewart et al., 1981a and 1981b)	Y/N	N	MT1001_ALG_0001_05Oct06 and MT1002_ALG_0002_05Oct06 and MT1002_ALG_0003_05Oct06 and MT1001_WTL_0025_05Oct06 to MT1001_WTL_0027_05Oct06 and MT1002_WTL_0028_05Oct06 to MT1002_WTL_0031_05Oct06	GRANITIC ROCKS: granite, granodiorite and quartz monzonite		Significant shear zones, faults and altered zones. Distant from alignment; requires long haul and through Hawthorne.
Desert Mountains	ANDESITE	North of alignment, approximately 10 miles NE of Wabuska	1 to 10	Andesitic rocks--Flow breccias, lava flows, and agglomerates with interbedded sediments. Locally includes basaltic and rhyolytic rocks. Includes Alta and Kate Peak Formations, and Chloropagus Formation of Axelrod (1956) (Moore, 1969)	N/N	N	MT1016_ALG_0028_06Oct06 and MT3018_WTL_0067_06Oct06 and MT3019_WTL_0068_06Oct06 and MT3019_WTL_0069_06Oct06	DARK VOLCANICS: Andesite capping weak volcaniclastic and sedimentary rocks.	Steep, high mountains, with narrow valley.	Viewed from alluvial fan. Suitable volcanics in relatively thin (<20') layer, capping weak rocks. Impractical to mine.
Cleaver Peak	BASALT	Approximately 5 miles north of Wabuska	5 to 10	Basalt--Predominantly thin lava flows with interbeds of scoriaceous basalt breccia and diatomaceous sediments. Includes McClellan Peak and Lousetown Formations. In part younger than alluvium. (Moore, 1969)	N/N	N	MT1016_ALG_0028_06Oct06 and MT3018_WTL_0067_06Oct06 and MT3019_WTL_0068_06Oct06 and MT3019_WTL_0069_06Oct06	DARK VOLCANICS (Andesite) capping weak volcaniclastic and sedimentary rocks.	Steep, high mountains, with narrow valley.	Viewed from alluvial fan. Suitable volcanics in relatively thin (<20') capping weak rocks. Impractical to mine.
Gabbs Range East	ANDESITE	East of alignment approximately 5 miles NE of Mina	2 to 3	Andesite lava flows and lahars interlayered with volcaniclastic sedimentary rocks. (Oldow and Dockery, 1993; Bell, 1995)	Y/N	N	MT1068A_ALG_0200_11Oct06 and MT1068_ALG_0201_11Oct06 to MT1068_ALG_0204_11Oct06	ANDESITE high strength, dark grey, porphyritic, fresh to slightly weathered, with weaker, thicker layers of andesitic lahars	Craggy topography	Closely to medium spaced fractures. Interfingering with volcaniclastics and lahar deposits make it impractical to quarry for ballast.

TABLE 3
CRITERIA FOR SUBBALLAST SOURCES

Character of Filter Materials	Ratio R_{50}	Ratio R_{15}
Uniform grain-size distribution (U= 3 to 4)	5 to 10	–
Well graded to poorly graded (non-uniform); subrounded grains	12 to 58	12 to 40
Well graded to poorly graded (non-uniform); angular particles	9 to 30	6 to 18

where:

$$R_{50} = \frac{D_{50} \text{ of filter material}}{D_{50} \text{ of material to be protected}} \quad \text{and} \quad R_{15} = \frac{D_{15} \text{ of filter material}}{D_{15} \text{ of material to be protected}}$$

Note:
Grain-size curves (semilogarithmic plot) of subballast and subgrade should be approximately parallel in the finer range of sizes.

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TABLE 4
UNIFIED SOIL CLASSIFICATION SYSTEM
SOILS SUITABLE FOR SUBBALLAST

Soil Type	Fines by Weight	USCS Group Symbol	USCS Group Name
GRAVEL	≤5%	GW	Well-graded gravel
		GP	Poorly graded gravel
	5% to 12%	GW-GM	Well-graded gravel with silt or with silt and sand
		GW-GC	Well-graded gravel with clay or with clay and sand
		GP-GM	Poorly graded gravel with silt or with silt and sand
		GP-GC	Poorly graded gravel with clay or with clay and sand
SAND	≤5%	SW	Well-graded sand
		SP	Poorly graded sand
	5% to 12%	SW-SM	Well-graded sand with silt or with silt and gravel
		SW-SC	Well-graded sand with clay or with clay and gravel
		SP-SM	Poorly graded sand with silt or with silt and gravel
		SP-SC	Poorly graded sand with clay or with clay and gravel

USCS = Unified Soil Classification System

TABLE 5
SUMMARY OF POTENTIAL SAND SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
MCS1	1453+20	1454+60	Luning-Oricto association	Luning	70	H3	2.1	Yes	GP, GW, SW	stratified very gravelly sand to gravelly loamy fine sand
MCS1	1453+20	1454+60	Luning-Oricto association	Oricto	15	H4	3.8	Yes	GM, GP-GM, GW, GW-GM, SW-SM	stratified extremely gravelly coarse sand to very gravelly loamy sand
MCS1	1455+60	1594+80	Luning-Oricto association	Luning	70	H3	2.1	Yes	GP, GW, SW	stratified very gravelly sand to gravelly loamy fine sand
MCS1	1455+60	1594+80	Luning-Oricto association	Oricto	15	H4	3.8	Yes	GM, GP-GM, GW, GW-GM, SW-SM	stratified extremely gravelly coarse sand to very gravelly loamy sand
MCS1	3739+10	3761+10	Luning-Timper-Gynelle association	Timper	30	H4	3.0	Yes	GM, GP-GM, GW-GM, SM, SW-SM	sr to loam to very gravelly coarse sand
MCS1	3864+20	3960+00	Luning-Timper-Gynelle association	Timper	30	H4	3.0	Yes	GM, GP-GM, GW-GM, SM, SW-SM	sr to loam to very gravelly coarse sand
MCS1	4041+60	4083+90	Gynelle-Oricto association, alkali	Oricto	20	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MCS1	4083+90	4089+70	Luning-Timper-Gynelle association	Timper	30	H4	3.0	Yes	GM, GP-GM, GW-GM, SM, SW-SM	sr to loam to very gravelly coarse sand
MCS1	4089+70	4110+90	Gynelle-Oricto association, alkali	Oricto	20	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MCS1	4110+90	4151+50	Luning-Timper-Gynelle association	Timper	30	H4	3.0	Yes	GM, GP-GM, GW-GM, SM, SW-SM	sr to loam to very gravelly coarse sand
MCS1	4151+50	4293+00	Gynelle-Oricto association, alkali	Oricto	20	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MCS1	4308+10	4333+50	Roic-Oricto-Wardenot association	Oricto	30	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MCS1	4333+50	4362+90	Gynelle-Oricto association, alkali	Oricto	20	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MCS1	4362+90	4499+00	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MCS1	4589+00	4634+90	Roic-Oricto-Wardenot association	Oricto	30	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MCS1	4634+90	4742+20	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	4776+50	4858+50	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	5442+20	5507+10	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	5507+10	5528+20	Gynelle-Oricto association, warm	Oricto	15	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	5553+10	5638+60	Gynelle-Oricto association, warm	Oricto	15	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	5651+20	5681+10	Gynelle-Oricto association, warm	Oricto	15	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand

TABLE 5
SUMMARY OF POTENTIAL SAND SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
MN1	5690+70	5753+70	Gynelle-Oricto association, warm	Oricto	15	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	6136+90	6232+90	Gynelle-Oricto association, alkali	Oricto	20	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	6257+40	6293+60	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	6317+20	6378+40	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	6522+80	6528+40	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	6531+80	6539+30	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	8200+10	8201+70	Leo-Izo association	Leo	55	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
MN1	8335+60	8342+70	Leo-Izo association	Leo	55	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
MN1	8369+90	8376+70	Leo-Izo association	Leo	55	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
MN1	8407+40	8425+30	Leo-Izo association	Leo	55	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
MN1	8428+70	8435+40	Leo-Izo association	Leo	55	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
MN2	4825+80	4954+90	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN2	4985+70	5002+20	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN2	5037+00	5218+30	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN2	5490+30	5617+90	Rustigate-Louderback-Cirac association	Louderback	25	H3	1.6	Yes	GM, GP-GM, GW-GM, SM, SW-SM	very gravelly sand
MN2	7176+50	7182+70	Leo-Izo association	Leo	55	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
MN2	7458+70	7475+30	Vindicator-Unsel-Leo association	Leo	15	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
MN2	7477+80	7478+30	Vindicator-Unsel-Leo association	Leo	15	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
MN2	7480+50	7488+90	Vindicator-Unsel-Leo association	Leo	15	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
S1	10013+70	10020+20	Appian loamy sand	Appian	90	H3	3.5	Yes	SP, SP-SM, SW-SM	coarse sand, sand
S1	10053+60	10095+50	Appian loamy sand	Appian	90	H3	3.5	Yes	SP, SP-SM, SW-SM	coarse sand, sand
S1	10152+70	10184+50	Hough sand, 0 to 2 percent slopes	Hough	90	H3	3.2	Yes	SM, SW-SM	stratified coarse sand to fine sand

TABLE 5
SUMMARY OF POTENTIAL SAND SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
S1	10184+50	10227+90	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S1	10264+80	10373+00	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S1	10389+10	10443+00	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S1	10443+00	10450+60	Hough sand, 0 to 2 percent slopes	Hough	90	H3	3.2	Yes	SM, SW-SM	stratified coarse sand to fine sand
S1	10450+60	10502+20	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S1	10505+40	10521+30	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S1	10542+00	10552+80	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S1	10569+70	10578+20	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S1	10578+20	10587+10	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand
S1	10591+70	10746+90	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand
S1	10866+10	10906+80	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand
S1	10921+70	10931+70	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand
S1	10947+30	10972+90	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand
S1	11186+70	11216+30	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand
S1	11216+30	11278+80	Isolde-Patna-Hawsley association	Hawsley	10	H3	1.5	Yes	SM, SW-SM	sand
S1	11278+80	11325+60	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand
S1	11325+60	11325+70	Isolde-Patna-Hawsley association	Hawsley	10	H3	1.5	Yes	SM, SW-SM	sand
S1	11325+70	11326+10	Isolde-Hawsley association	Hawsley	40	H2	4.7	Yes	SM, SW-SM	stratified coarse sand to fine sand
S1	11326+10	11326+20	Isolde-Patna-Hawsley association	Hawsley	10	H3	1.5	Yes	SM, SW-SM	sand
S1	11326+20	11349+10	Isolde-Hawsley association	Hawsley	40	H2	4.7	Yes	SM, SW-SM	stratified coarse sand to fine sand
S1	11507+20	11553+50	Isolde-Patna-Hawsley association	Hawsley	10	H3	1.5	Yes	SM, SW-SM	sand
S2	10013+70	10020+20	Appian loamy sand	Appian	90	H3	3.5	Yes	SP, SP-SM, SW-SM	coarse sand, sand
S2	10053+60	10095+50	Appian loamy sand	Appian	90	H3	3.5	Yes	SP, SP-SM, SW-SM	coarse sand, sand

TABLE 5
SUMMARY OF POTENTIAL SAND SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
S2	10152+70	10184+50	Hough sand, 0 to 2 percent slopes	Hough	90	H3	3.2	Yes	SM, SW-SM	stratified coarse sand to fine sand
S2	10184+50	10227+90	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S2	10264+80	10373+00	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S2	10389+10	10443+00	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S2	10443+00	10450+60	Hough sand, 0 to 2 percent slopes	Hough	90	H3	3.2	Yes	SM, SW-SM	stratified coarse sand to fine sand
S2	10450+60	10502+20	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S2	10505+40	10521+30	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S2	10542+00	10552+80	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S2	10569+70	10578+20	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S2	10578+20	10587+10	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand
S2	10591+70	10746+90	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand
S2	10866+10	10911+10	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand
S2	10921+00	10929+60	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand
S2	10940+00	11261+20	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand
S2	11261+20	11302+20	Bango-Hawsley complex, 0 to 4 percent slopes	Hawsley	25	H3	1.5	Yes	SM, SW-SM	sand
S2	11302+20	11309+30	Isolde-Patna-Hawsley association	Hawsley	10	H3	1.5	Yes	SM, SW-SM	sand
S2	11341+90	11397+10	Isolde-Patna-Hawsley association	Hawsley	10	H3	1.5	Yes	SM, SW-SM	sand
S2	11417+60	11472+70	Isolde-Patna-Hawsley association	Hawsley	10	H3	1.5	Yes	SM, SW-SM	sand
S3	10499+40	10529+00	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand
S3	10529+00	10591+50	Isolde-Patna-Hawsley association	Hawsley	10	H3	1.5	Yes	SM, SW-SM	sand
S3	10591+50	10638+30	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand

TABLE 5
SUMMARY OF POTENTIAL SAND SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
S3	10638+30	10638+40	Isolde-Patna-Hawsley association	Hawsley	10	H3	1.5	Yes	SM, SW-SM	sand
S3	10638+40	10638+80	Isolde-Hawsley association	Hawsley	40	H2	4.7	Yes	SM, SW-SM	stratified coarse sand to fine sand
S3	10638+80	10638+90	Isolde-Patna-Hawsley association	Hawsley	10	H3	1.5	Yes	SM, SW-SM	sand
S3	10638+90	10661+80	Isolde-Hawsley association	Hawsley	40	H2	4.7	Yes	SM, SW-SM	stratified coarse sand to fine sand
S3	10819+90	10866+20	Isolde-Patna-Hawsley association	Hawsley	10	H3	1.5	Yes	SM, SW-SM	sand
S4	10017+20	10021+40	Appian loamy sand	Appian	90	H3	3.5	Yes	SP, SP-SM, SW-SM	coarse sand, sand
S4	10054+60	10096+60	Appian loamy sand	Appian	90	H3	3.5	Yes	SP, SP-SM, SW-SM	coarse sand, sand
S4	10153+70	10185+50	Hough sand, 0 to 2 percent slopes	Hough	90	H3	3.2	Yes	SM, SW-SM	stratified coarse sand to fine sand
S4	10185+50	10228+90	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S4	10265+80	10374+00	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S4	10390+20	10444+00	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S4	10444+00	10451+70	Hough sand, 0 to 2 percent slopes	Hough	90	H3	3.2	Yes	SM, SW-SM	stratified coarse sand to fine sand
S4	10451+70	10503+20	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S4	10506+40	10522+30	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S4	10543+00	10553+90	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S4	10570+70	10579+20	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S4	10579+20	10588+20	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand
S4	10592+30	10696+90	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand
S4	10728+40	10791+10	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand
S4	10851+40	10864+40	Patna-Hawsley sands, 0 to 4 percent slopes	Hawsley	40	H3	1.5	Yes	SM, SW-SM	sand
S4	10935+00	10939+20	Isolde-Hawsley association	Hawsley	40	H2	4.7	Yes	SM, SW-SM	stratified coarse sand to fine sand
S4	11051+60	11072+50	Hawsley sand, 0 to 4 percent slopes	Hawsley	90	H3	1.5	Yes	SM, SW-SM	sand
S4	11072+50	11108+50	Typic Torriorthents-Gynelle-Oricto association	Oricto	15	H4	3.8	Yes	GM, GP-GM, GW, GW-GM, SW-SM	stratified extremely gravelly coarse sand to very gravelly loamy sand
S4	11348+20	11366+00	Hawsley-Izo association	Hawsley	60	H3	1.5	Yes	SM, SW-SM	sand
S4	11390+20	11565+00	Isolde-Hawsley association	Hawsley	40	H2	4.7	Yes	SM, SW-SM	stratified coarse sand to fine sand

TABLE 5
SUMMARY OF POTENTIAL SAND SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
S4	11936+10	11982+50	Isolde-Patna-Hawsley association	Hawsley	10	H3	1.5	Yes	SM, SW-SM	sand
S5	10016+50	10021+20	Appian loamy sand	Appian	90	H3	3.5	Yes	SP, SP-SM, SW-SM	coarse sand, sand
S5	10054+80	10096+70	Appian loamy sand	Appian	90	H3	3.5	Yes	SP, SP-SM, SW-SM	coarse sand, sand
S5	10151+80	10180+20	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S5	10272+20	10281+70	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S5	10620+40	10683+50	Hawsley-Gamgee association	Hawsley	55	H2	4.3	Yes	SM, SW-SM	sand
S5	10701+30	10760+50	Hawsley-Gamgee association	Hawsley	55	H2	4.3	Yes	SM, SW-SM	sand
S5	10765+30	10767+20	Hawsley-Gamgee association	Hawsley	55	H2	4.3	Yes	SM, SW-SM	sand
S5	10773+70	10796+00	Hawsley-Gamgee association	Hawsley	55	H2	4.3	Yes	SM, SW-SM	sand
S5	10825+40	10829+50	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S5	10916+40	10923+90	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S5	10962+10	10978+60	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S5	11245+60	11266+20	Hawsley sand, 0 to 4 percent slopes	Hawsley	90	H3	1.5	Yes	SM, SW-SM	sand
S5	11266+20	11302+30	Typic Torriorthents-Gynelle-Oricto association	Oricto	15	H4	3.8	Yes	GM, GP-GM, GW, GW-GM, SW-SM	stratified extremely gravelly coarse sand to very gravelly loamy sand
S5	11541+90	11559+70	Hawsley-Izo association	Hawsley	60	H3	1.5	Yes	SM, SW-SM	sand
S5	11583+90	11758+80	Isolde-Hawsley association	Hawsley	40	H2	4.7	Yes	SM, SW-SM	stratified coarse sand to fine sand
S5	12129+90	12176+20	Isolde-Patna-Hawsley association	Hawsley	10	H3	1.5	Yes	SM, SW-SM	sand
S6	10016+50	10021+20	Appian loamy sand	Appian	90	H3	3.5	Yes	SP, SP-SM, SW-SM	coarse sand, sand
S6	10054+80	10096+70	Appian loamy sand	Appian	90	H3	3.5	Yes	SP, SP-SM, SW-SM	coarse sand, sand
S6	10151+80	10180+20	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S6	10272+20	10281+70	Patna sand, 0 to 4 percent slopes	Patna	85	H3	3.7	Yes	SM, SW-SM	loamy sand, sand
S6	10620+40	10683+50	Hawsley-Gamgee association	Hawsley	55	H2	4.3	Yes	SM, SW-SM	sand
S6	10701+30	10760+50	Hawsley-Gamgee association	Hawsley	55	H2	4.3	Yes	SM, SW-SM	sand
S6	10765+30	10767+20	Hawsley-Gamgee association	Hawsley	55	H2	4.3	Yes	SM, SW-SM	sand

TABLE 5
SUMMARY OF POTENTIAL SAND SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
S6	10773+70	10796+30	Hawsley-Gamgee association	Hawsley	55	H2	4.3	Yes	SM, SW-SM	sand
S6	11375+10	11406+50	Rednik-Trocken-Bluewing association	Rednik	40	H4	3.6	Yes	GM, GP-GM, GW, GW-GM, SW-SM	extremely gravelly loamy coarse sand, extremely gravelly loamy sand, very gravelly sand
S6	11612+90	11791+70	Isolde-Hawsley association	Hawsley	40	H2	4.7	Yes	SM, SW-SM	stratified coarse sand to fine sand
S6	12162+90	12209+20	Isolde-Patna-Hawsley association	Hawsley	10	H3	1.5	Yes	SM, SW-SM	sand

Note:
[1] Column " At Bottom" indicates whether bottom depth of soil layer is at maximum depth (typically 5 feet) of recorded SSURGO data.

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
MCS1	1453+20	1454+60	Luning-Oricto association	Oricto	15	H4	3.8	Yes	GM, GP-GM, GW, GW-GM, SW-SM	stratified extremely gravelly coarse sand to very gravelly loamy sand
MCS1	1453+20	1454+60	Luning-Oricto association	Luning	70	H3	2.1	Yes	GP, GW, SW	stratified very gravelly sand to gravelly loamy fine sand
MCS1	1455+60	1594+80	Luning-Oricto association	Luning	70	H3	2.1	Yes	GP, GW, SW	stratified very gravelly sand to gravelly loamy fine sand
MCS1	1455+60	1594+80	Luning-Oricto association	Oricto	15	H4	3.8	Yes	GM, GP-GM, GW, GW-GM, SW-SM	stratified extremely gravelly coarse sand to very gravelly loamy sand
MCS1	1791+70	1960+90	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2170+40	2239+40	Sodaspring-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2334+10	2351+80	Izo, rarely flooded-Izo association	Izo	55	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2334+10	2351+80	Izo, rarely flooded-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2367+80	2374+70	Izo, rarely flooded-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2367+80	2374+70	Izo, rarely flooded-Izo association	Izo	55	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2374+70	2389+10	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2389+10	2396+80	Izo, rarely flooded-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2389+10	2396+80	Izo, rarely flooded-Izo association	Izo	55	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2396+80	2400+60	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2400+60	2405+30	Izo, rarely flooded-Izo association	Izo	55	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2400+60	2405+30	Izo, rarely flooded-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2405+30	2410+20	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2410+20	2416+10	Izo, rarely flooded-Izo association	Izo	55	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2410+20	2416+10	Izo, rarely flooded-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2416+10	2597+60	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
MCS1	2602+50	2612+70	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2777+20	2804+50	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2807+00	2816+80	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2820+30	2822+60	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2882+50	2927+10	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	2947+20	3012+20	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3012+20	3014+90	Candelaria-Gynelle-Izo association	Izo	10	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3012+20	3014+90	Candelaria-Gynelle-Izo association	Candelaria	50	H4	3.6	Yes	GP-GM, GW, GW-GM	stratified extremely gravelly sand to very gravelly loamy coarse sand
MCS1	3014+90	3056+40	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3056+40	3114+90	Izo, rarely flooded-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3056+40	3114+90	Izo, rarely flooded-Izo association	Izo	55	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3114+90	3124+00	Candelaria-Gynelle-Izo association	Candelaria	50	H4	3.6	Yes	GP-GM, GW, GW-GM	stratified extremely gravelly sand to very gravelly loamy coarse sand
MCS1	3114+90	3124+00	Candelaria-Gynelle-Izo association	Izo	10	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3124+00	3146+00	Izo, rarely flooded-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3124+00	3146+00	Izo, rarely flooded-Izo association	Izo	55	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3146+00	3154+30	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3154+30	3226+00	Izo, rarely flooded-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3154+30	3226+00	Izo, rarely flooded-Izo association	Izo	55	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3226+00	3229+80	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3229+80	3246+00	Izo, rarely flooded-Izo association	Izo	55	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
MCS1	3229+80	3246+00	Izo, rarely flooded-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3246+00	3252+90	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3252+90	3258+90	Izo, rarely flooded-Izo association	Izo	55	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3252+90	3258+90	Izo, rarely flooded-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3258+90	3380+10	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3380+10	3396+90	Candelaria-Gynelle-Izo association	Izo	10	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3380+10	3396+90	Candelaria-Gynelle-Izo association	Candelaria	50	H4	3.6	Yes	GP-GM, GW, GW-GM	stratified extremely gravelly sand to very gravelly loamy coarse sand
MCS1	3422+10	3431+90	Candelaria-Typic Torriorthents association	Candelaria	65	H3	3.6	Yes	GP-GM, GW, GW-GM	stratified extremely gravelly sand to very gravelly loamy coarse sand
MCS1	3446+00	3500+20	Candelaria-Typic Torriorthents association	Candelaria	65	H3	3.6	Yes	GP-GM, GW, GW-GM	stratified extremely gravelly sand to very gravelly loamy coarse sand
MCS1	3500+20	3560+60	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3563+60	3571+70	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3571+70	3572+20	Candelaria, dry-Izo association	Candelaria	75	H4	3.6	Yes	GP-GM, GW, GW-GM	stratified extremely gravelly sand to very gravelly loamy coarse sand
MCS1	3571+70	3572+20	Candelaria, dry-Izo association	Izo	10	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3572+20	3573+80	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3573+80	3584+90	Candelaria, dry-Izo association	Izo	10	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3573+80	3584+90	Candelaria, dry-Izo association	Candelaria	75	H4	3.6	Yes	GP-GM, GW, GW-GM	stratified extremely gravelly sand to very gravelly loamy coarse sand
MCS1	3584+90	3588+90	Gynelle-Izo association	Izo	35	H2	4.7	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3588+90	3642+70	Candelaria, dry-Izo association	Izo	10	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
MCS1	3588+90	3642+70	Candelaria, dry-Izo association	Candelaria	75	H4	3.6	Yes	GP-GM, GW, GW-GM	stratified extremely gravelly sand to very gravelly loamy coarse sand
MCS1	3642+70	3711+70	Candelaria-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
MCS1	3642+70	3711+70	Candelaria-Izo association	Candelaria	70	H4	3.1	Yes	GP-GM, GW, GW-GM	sr to extremely gravelly sand to very gravelly loamy coarse sand
MCS1	3711+70	3713+80	Unsel-Wardenot-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MCS1	3711+70	3713+80	Unsel-Wardenot-Izo association	Wardenot	30	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MCS1	3711+70	3713+80	Unsel-Wardenot-Izo association	Unsel	45	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MCS1	3713+80	3723+50	Candelaria-Izo association	Candelaria	70	H4	3.1	Yes	GP-GM, GW, GW-GM	sr to extremely gravelly sand to very gravelly loamy coarse sand
MCS1	3713+80	3723+50	Candelaria-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MCS1	3723+50	3739+10	Unsel-Wardenot-Izo association	Unsel	45	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MCS1	3723+50	3739+10	Unsel-Wardenot-Izo association	Wardenot	30	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MCS1	3723+50	3739+10	Unsel-Wardenot-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MCS1	3739+10	3761+10	Luning-Timper-Gynelle association	Timper	30	H4	3	Yes	GM, GP-GM, GW-GM, SM, SW-SM	sr to loam to very gravelly coarse sand
MCS1	3761+10	3864+20	Unsel-Wardenot-Izo association	Unsel	45	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MCS1	3761+10	3864+20	Unsel-Wardenot-Izo association	Wardenot	30	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MCS1	3761+10	3864+20	Unsel-Wardenot-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MCS1	3864+20	3960+00	Luning-Timper-Gynelle association	Timper	30	H4	3	Yes	GM, GP-GM, GW-GM, SM, SW-SM	sr to loam to very gravelly coarse sand
MCS1	3960+00	4041+60	Unsel-Wardenot-Izo association	Wardenot	30	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MCS1	3960+00	4041+60	Unsel-Wardenot-Izo association	Unsel	45	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MCS1	3960+00	4041+60	Unsel-Wardenot-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MCS1	4041+60	4083+90	Gynelle-Oricto association, alkali	Oricto	20	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MCS1	4083+90	4089+70	Luning-Timper-Gynelle association	Timper	30	H4	3	Yes	GM, GP-GM, GW-GM, SM, SW-SM	sr to loam to very gravelly coarse sand
MCS1	4089+70	4110+90	Gynelle-Oricto association, alkali	Oricto	20	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
MCS1	4110+90	4151+50	Luning-Timper-Gynelle association	Timper	30	H4	3	Yes	GM, GP-GM, GW-GM, SM, SW-SM	sr to loam to very gravelly coarse sand
MCS1	4151+50	4293+00	Gynelle-Oricto association, alkali	Oricto	20	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MCS1	4293+00	4308+10	Zaba-Gynelle association	Zaba	60	H3	3.1	Yes	GP-GM, GW, GW-GM	extremely gravelly coarse sand, extremely gravelly sand, very gravelly sand
MCS1	4308+10	4333+50	Roic-Oricto-Wardenot association	Oricto	30	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MCS1	4308+10	4333+50	Roic-Oricto-Wardenot association	Wardenot	20	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MCS1	4333+50	4362+90	Gynelle-Oricto association, alkali	Oricto	20	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MCS1	4362+90	4499+00	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MCS1	4499+00	4589+00	Roic-Wardenot-Badland association	Wardenot	30	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MCS1	4589+00	4634+90	Roic-Oricto-Wardenot association	Oricto	30	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MCS1	4589+00	4634+90	Roic-Oricto-Wardenot association	Wardenot	20	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MCS1	4634+90	4742+20	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	4776+50	4858+50	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	4871+30	4892+00	Zaba very gravelly loam, 0 to 8 percent slopes	Zaba	90	H3	3.1	Yes	GP-GM, GW, GW-GM	extremely gravelly coarse sand, extremely gravelly sand, very gravelly sand
MN1	4950+50	4966+40	Yomba-Playas-Youngston association, alkali	Yomba	40	H4	3.5	Yes	GP, GW	extremely gravelly sand, very gravelly sand
MN1	5057+20	5066+50	Zaba-Gynelle association	Zaba	60	H3	3.1	Yes	GP-GM, GW, GW-GM	extremely gravelly coarse sand, extremely gravelly sand, very gravelly sand
MN1	5066+50	5117+50	Unsel-Belted-Orphant association	Unsel	40	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MN1	5066+50	5117+50	Unsel-Belted-Orphant association	Belted	30	H4	2.9	Yes	GW	extremely gravelly sand, very gravelly sand
MN1	5117+50	5231+90	Stonell-Wardenot-Izo association, moist	Izo	20	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
MN1	5117+50	5231+90	Stonell-Wardenot-Izo association, moist	Wardenot	30	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	5117+50	5231+90	Stonell-Wardenot-Izo association, moist	Stonell	35	H3	4.2	Yes	GM, GP-GM, GW-GM	sr to very gravelly sandy loam to very gravelly loamy coarse sand
MN1	5231+90	5295+20	Roic-Wardenot-Badland association	Wardenot	30	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	5295+20	5321+40	Stonell-Roic-Wardenot association	Wardenot	20	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	5295+20	5321+40	Stonell-Roic-Wardenot association	Stonell	35	H3	4.2	Yes	GM, GP-GM, GW-GM	sr to very gravelly sandy loam to very gravelly loamy coarse sand
MN1	5321+40	5380+70	Stonell-Wardenot-Izo association, moist	Izo	20	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN1	5321+40	5380+70	Stonell-Wardenot-Izo association, moist	Wardenot	30	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	5321+40	5380+70	Stonell-Wardenot-Izo association, moist	Stonell	35	H3	4.2	Yes	GM, GP-GM, GW-GM	sr to very gravelly sandy loam to very gravelly loamy coarse sand
MN1	5380+70	5432+90	Stonell-Roic-Wardenot association	Wardenot	20	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	5380+70	5432+90	Stonell-Roic-Wardenot association	Stonell	35	H3	4.2	Yes	GM, GP-GM, GW-GM	sr to very gravelly sandy loam to very gravelly loamy coarse sand
MN1	5432+90	5442+20	Wardenot-Roic association	Wardenot	70	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	5442+20	5507+10	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	5507+10	5528+20	Gynelle-Oricto association, warm	Oricto	15	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	5553+10	5638+60	Gynelle-Oricto association, warm	Oricto	15	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	5651+20	5681+10	Gynelle-Oricto association, warm	Oricto	15	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	5681+10	5690+70	Badland-Belcher-Belted association	Belted	20	H4	2.9	Yes	GW	extremely gravelly sand, very gravelly sand
MN1	5690+70	5753+70	Gynelle-Oricto association, warm	Oricto	15	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	5753+70	5770+10	Badland-Belcher-Belted association	Belted	20	H4	2.9	Yes	GW	extremely gravelly sand, very gravelly sand
MN1	5861+40	5877+30	Badland-Belcher-Belted association	Belted	20	H4	2.9	Yes	GW	extremely gravelly sand, very gravelly sand
MN1	5881+90	5908+80	Badland-Belcher-Belted association	Belted	20	H4	2.9	Yes	GW	extremely gravelly sand, very gravelly sand

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
MN1	6136+90	6232+90	Gynelle-Oricto association, alkali	Oricto	20	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	6232+90	6257+40	Roic-Wardenot-Badland association	Wardenot	30	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	6257+40	6293+60	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	6293+60	6317+20	Gynelle-Wardenot association	Wardenot	35	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	6317+20	6378+40	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	6378+40	6522+80	Wardenot-Gynelle-Stonell association	Wardenot	45	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	6378+40	6522+80	Wardenot-Gynelle-Stonell association	Stonell	15	H3	4.2	Yes	GM, GP-GM, GW-GM	sr to very gravelly sandy loam to very gravelly loamy coarse sand
MN1	6522+80	6528+40	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	6528+40	6531+80	Wardenot-Gynelle-Stonell association	Wardenot	45	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	6528+40	6531+80	Wardenot-Gynelle-Stonell association	Stonell	15	H3	4.2	Yes	GM, GP-GM, GW-GM	sr to very gravelly sandy loam to very gravelly loamy coarse sand
MN1	6531+80	6539+30	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN1	6630+00	6674+00	Annaw-Wardenot-Ardivey association	Annaw	45	H3	4.1	Yes	GM, GP-GM, GW-GM	sr to extremely gravelly loamy coarse sand to very gravelly loamy sand
MN1	6630+00	6674+00	Annaw-Wardenot-Ardivey association	Ardivey	15	H3	3.8	Yes	GW, GW-GM	extremely gravelly loamy sand
MN1	6630+00	6674+00	Annaw-Wardenot-Ardivey association	Wardenot	25	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	6674+00	6682+90	Stonell-Wardenot-Izo association, moist	Izo	20	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN1	6674+00	6682+90	Stonell-Wardenot-Izo association, moist	Wardenot	30	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	6674+00	6682+90	Stonell-Wardenot-Izo association, moist	Stonell	35	H3	4.2	Yes	GM, GP-GM, GW-GM	sr to very gravelly sandy loam to very gravelly loamy coarse sand
MN1	6682+90	6759+20	Annaw-Wardenot-Ardivey association	Annaw	45	H3	4.1	Yes	GM, GP-GM, GW-GM	sr to extremely gravelly loamy coarse sand to very gravelly loamy sand
MN1	6682+90	6759+20	Annaw-Wardenot-Ardivey association	Wardenot	25	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	6682+90	6759+20	Annaw-Wardenot-Ardivey association	Ardivey	15	H3	3.8	Yes	GW, GW-GM	extremely gravelly loamy sand

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
MN1	6762+40	6763+10	Annaw-Wardenot-Ardivey association	Wardenot	25	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	6762+40	6763+10	Annaw-Wardenot-Ardivey association	Ardivey	15	H3	3.8	Yes	GW, GW-GM	extremely gravelly loamy sand
MN1	6762+40	6763+10	Annaw-Wardenot-Ardivey association	Annaw	45	H3	4.1	Yes	GM, GP-GM, GW-GM	sr to extremely gravelly loamy coarse sand to very gravelly loamy sand
MN1	6842+40	7102+60	Annaw-Wardenot-Ardivey association	Ardivey	15	H3	3.8	Yes	GW, GW-GM	extremely gravelly loamy sand
MN1	6842+40	7102+60	Annaw-Wardenot-Ardivey association	Annaw	45	H3	4.1	Yes	GM, GP-GM, GW-GM	sr to extremely gravelly loamy coarse sand to very gravelly loamy sand
MN1	6842+40	7102+60	Annaw-Wardenot-Ardivey association	Wardenot	25	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	7102+60	7290+60	Zadvar-Veet-Lyda association	Zadvar	45	H4	3.1	Yes	GM, GP-GM, GW-GM	sr to extremely gravelly sandy loam to very gravelly coarse sand
MN1	7102+60	7290+60	Zadvar-Veet-Lyda association	Veet	25	H3	3.8	Yes	GM, GP-GM, GW-GM	sr to extremely gravelly sandy loam to very gravelly loamy coarse sand
MN1	7386+20	7415+60	Zadvar-Stewval association	Zadvar	50	H4	3.1	Yes	GM, GP-GM, GW-GM	sr to extremely gravelly sandy loam to very gravelly coarse sand
MN1	7437+10	7448+30	Zadvar-Stewval association	Zadvar	50	H4	3.1	Yes	GM, GP-GM, GW-GM	sr to extremely gravelly sandy loam to very gravelly coarse sand
MN1	7448+30	7503+60	Zadvar-Veet-Lyda association	Veet	25	H3	3.8	Yes	GM, GP-GM, GW-GM	sr to extremely gravelly sandy loam to very gravelly loamy coarse sand
MN1	7448+30	7503+60	Zadvar-Veet-Lyda association	Zadvar	45	H4	3.1	Yes	GM, GP-GM, GW-GM	sr to extremely gravelly sandy loam to very gravelly coarse sand
MN1	7529+20	7536+40	Zadvar-Veet-Lyda association	Zadvar	45	H4	3.1	Yes	GM, GP-GM, GW-GM	sr to extremely gravelly sandy loam to very gravelly coarse sand
MN1	7529+20	7536+40	Zadvar-Veet-Lyda association	Veet	25	H3	3.8	Yes	GM, GP-GM, GW-GM	sr to extremely gravelly sandy loam to very gravelly loamy coarse sand
MN1	7545+30	7776+10	Lyda-Ardivey-Izo association	Ardivey	25	H3	3.8	Yes	GW, GW-GM	extremely gravelly loamy sand
MN1	7545+30	7776+10	Lyda-Ardivey-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN1	7776+10	7788+20	Tomel-Wardenot association	Wardenot	20	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	7776+10	7788+20	Tomel-Wardenot association	Tomel	65	H4	2.8	Yes	GP, GW	extremely gravelly sand, very gravelly sand
MN1	7788+20	7793+20	Lyda-Ardivey-Izo association	Ardivey	25	H3	3.8	Yes	GW, GW-GM	extremely gravelly loamy sand
MN1	7788+20	7793+20	Lyda-Ardivey-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
MN1	7793+20	7886+20	Tomel-Wardenot association	Wardenot	20	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	7793+20	7886+20	Tomel-Wardenot association	Tomel	65	H4	2.8	Yes	GP, GW	extremely gravelly sand, very gravelly sand
MN1	7886+20	7941+00	Ardivey-Wardenot-Lyda association	Ardivey	50	H3	3.8	Yes	GW, GW-GM	extremely gravelly loamy sand
MN1	7886+20	7941+00	Ardivey-Wardenot-Lyda association	Wardenot	20	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	7941+00	7983+70	Vigus-Wardenot association	Wardenot	20	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	7983+70	8005+00	Tomel-Wardenot association	Tomel	65	H4	2.8	Yes	GP, GW	extremely gravelly sand, very gravelly sand
MN1	7983+70	8005+00	Tomel-Wardenot association	Wardenot	20	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	8005+00	8031+80	Wardenot-Annaw-Izo association	Izo	20	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN1	8005+00	8031+80	Wardenot-Annaw-Izo association	Annaw	25	H3	4.1	Yes	GM, GP-GM, GW-GM	sr to extremely gravelly loamy coarse sand to very gravelly loamy sand
MN1	8005+00	8031+80	Wardenot-Annaw-Izo association	Wardenot	40	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	8049+60	8057+20	Wardenot-Annaw-Izo association	Annaw	25	H3	4.1	Yes	GM, GP-GM, GW-GM	sr to extremely gravelly loamy coarse sand to very gravelly loamy sand
MN1	8049+60	8057+20	Wardenot-Annaw-Izo association	Izo	20	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN1	8049+60	8057+20	Wardenot-Annaw-Izo association	Wardenot	40	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	8140+10	8200+10	Tomel-Ardivey-Wardenot association	Wardenot	20	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	8140+10	8200+10	Tomel-Ardivey-Wardenot association	Tomel	35	H4	2.8	Yes	GP, GW	extremely gravelly sand, very gravelly sand
MN1	8140+10	8200+10	Tomel-Ardivey-Wardenot association	Ardivey	30	H3	3.8	Yes	GW, GW-GM	extremely gravelly loamy sand
MN1	8200+10	8201+70	Leo-Izo association	Izo	30	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN1	8200+10	8201+70	Leo-Izo association	Leo	55	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
MN1	8201+70	8319+90	Tomel-Ardivey-Wardenot association	Ardivey	30	H3	3.8	Yes	GW, GW-GM	extremely gravelly loamy sand
MN1	8201+70	8319+90	Tomel-Ardivey-Wardenot association	Tomel	35	H4	2.8	Yes	GP, GW	extremely gravelly sand, very gravelly sand

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
MN1	8201+70	8319+90	Tomel-Ardivey-Wardenot association	Wardenot	20	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	8335+60	8342+70	Leo-Izo association	Izo	30	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN1	8335+60	8342+70	Leo-Izo association	Leo	55	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
MN1	8342+70	8369+90	Tokoper-Ardivey association	Ardivey	25	H3	3.8	Yes	GW, GW-GM	extremely gravelly loamy sand
MN1	8369+90	8376+70	Leo-Izo association	Leo	55	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
MN1	8369+90	8376+70	Leo-Izo association	Izo	30	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN1	8376+70	8407+40	Tokoper-Ardivey association	Ardivey	25	H3	3.8	Yes	GW, GW-GM	extremely gravelly loamy sand
MN1	8407+40	8425+30	Leo-Izo association	Izo	30	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN1	8407+40	8425+30	Leo-Izo association	Leo	55	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
MN1	8425+30	8428+70	Tomel-Ardivey-Wardenot association	Ardivey	30	H3	3.8	Yes	GW, GW-GM	extremely gravelly loamy sand
MN1	8425+30	8428+70	Tomel-Ardivey-Wardenot association	Tomel	35	H4	2.8	Yes	GP, GW	extremely gravelly sand, very gravelly sand
MN1	8425+30	8428+70	Tomel-Ardivey-Wardenot association	Wardenot	20	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	8428+70	8435+40	Leo-Izo association	Izo	30	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN1	8428+70	8435+40	Leo-Izo association	Leo	55	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
MN1	8435+40	8470+20	Tomel-Ardivey-Wardenot association	Ardivey	30	H3	3.8	Yes	GW, GW-GM	extremely gravelly loamy sand
MN1	8435+40	8470+20	Tomel-Ardivey-Wardenot association	Tomel	35	H4	2.8	Yes	GP, GW	extremely gravelly sand, very gravelly sand
MN1	8435+40	8470+20	Tomel-Ardivey-Wardenot association	Wardenot	20	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	8470+20	8476+40	Laxal-Wardenot-Ardivey association	Ardivey	15	H3	3.8	Yes	GW, GW-GM	extremely gravelly loamy sand
MN1	8470+20	8476+40	Laxal-Wardenot-Ardivey association	Wardenot	30	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN1	8476+40	8502+70	Unsel-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
MN1	8476+40	8502+70	Unsel-Izo association	Unsel	70	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MN1	8502+70	8603+00	Wardenot-Izo association	Izo	40	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN1	8502+70	8603+00	Wardenot-Izo association	Wardenot	50	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN2	4825+80	4954+90	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN2	4954+90	4985+70	Zaba-Gynelle association	Zaba	60	H3	3.1	Yes	GP-GM, GW, GW-GM	extremely gravelly coarse sand, extremely gravelly sand, very gravelly sand
MN2	4985+70	5002+20	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN2	5002+20	5037+00	Zaba-Gynelle association	Zaba	60	H3	3.1	Yes	GP-GM, GW, GW-GM	extremely gravelly coarse sand, extremely gravelly sand, very gravelly sand
MN2	5037+00	5218+30	Gynelle-Oricto association	Oricto	40	H4	3.4	Yes	GM, GP-GM, GW, GW-GM, SW-SM	sr to extremely gravelly coarse sand to very gravelly loamy sand
MN2	5246+60	5251+50	Zaba very gravelly loam, 0 to 8 percent slopes	Zaba	90	H3	3.1	Yes	GP-GM, GW, GW-GM	extremely gravelly coarse sand, extremely gravelly sand, very gravelly sand
MN2	5264+80	5270+40	Zaba very gravelly loam, 0 to 8 percent slopes	Zaba	90	H3	3.1	Yes	GP-GM, GW, GW-GM	extremely gravelly coarse sand, extremely gravelly sand, very gravelly sand
MN2	5490+30	5617+90	Rustigate-Louderback-Cirac association	Louderback	25	H3	1.6	Yes	GM, GP-GM, GW-GM, SM, SW-SM	very gravelly sand
MN2	5617+90	5636+50	Yomba-Playas-Kawich association	Yomba	30	H4	3.5	Yes	GP, GW	extremely gravelly sand, very gravelly sand
MN2	5636+50	5729+60	Yomba-Kawich association	Yomba	50	H4	3.5	Yes	GP, GW	extremely gravelly sand, very gravelly sand
MN2	5729+60	5761+30	Yomba-Playas-Kawich association	Yomba	30	H4	3.5	Yes	GP, GW	extremely gravelly sand, very gravelly sand
MN2	5761+30	5809+80	Yomba-Kawich association	Yomba	50	H4	3.5	Yes	GP, GW	extremely gravelly sand, very gravelly sand
MN2	5809+80	5859+80	Noyson-Stumble-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN2	5873+60	5880+90	Noyson-Stumble-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN2	5918+40	5980+40	Noyson-Stumble-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
MN2	5980+40	6039+90	Unsel-Belted-Orphant association	Unsel	40	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MN2	5980+40	6039+90	Unsel-Belted-Orphant association	Belted	30	H4	2.9	Yes	GW	extremely gravelly sand, very gravelly sand
MN2	6039+90	6164+70	Noyson-Stumble-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN2	6640+20	6660+20	Stumble-Belcher-Izo association	Izo	20	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN2	6660+20	6980+20	Unsel-Wardenot-Izo association	Unsel	45	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MN2	6660+20	6980+20	Unsel-Wardenot-Izo association	Wardenot	30	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN2	6660+20	6980+20	Unsel-Wardenot-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN2	6980+20	6986+70	Stumble-Wardenot-Unsel association	Wardenot	30	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN2	6980+20	6986+70	Stumble-Wardenot-Unsel association	Unsel	20	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MN2	6986+70	7176+50	Unsel-Wardenot-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN2	6986+70	7176+50	Unsel-Wardenot-Izo association	Wardenot	30	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN2	6986+70	7176+50	Unsel-Wardenot-Izo association	Unsel	45	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MN2	7176+50	7182+70	Leo-Izo association	Leo	55	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
MN2	7176+50	7182+70	Leo-Izo association	Izo	30	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN2	7182+70	7458+70	Unsel-Izo association	Unsel	70	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MN2	7182+70	7458+70	Unsel-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN2	7458+70	7475+30	Vindicator-Unsel-Leo association	Unsel	30	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MN2	7458+70	7475+30	Vindicator-Unsel-Leo association	Leo	15	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
MN2	7475+30	7477+80	Unsel-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN2	7475+30	7477+80	Unsel-Izo association	Unsel	70	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
MN2	7477+80	7478+30	Vindicator-Unsel-Leo association	Unsel	30	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MN2	7477+80	7478+30	Vindicator-Unsel-Leo association	Leo	15	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
MN2	7478+30	7480+50	Unsel-Izo association	Unsel	70	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MN2	7478+30	7480+50	Unsel-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN2	7480+50	7488+90	Vindicator-Unsel-Leo association	Unsel	30	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MN2	7480+50	7488+90	Vindicator-Unsel-Leo association	Leo	15	H2	4.7	Yes	GM, GW-GM, SM, SW-SM	sr to gravelly fine sandy loam to extremely gravelly coarse sand
MN2	7488+90	7498+50	Unsel-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN2	7488+90	7498+50	Unsel-Izo association	Unsel	70	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MN3	300+00	388+80	Unsel-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN3	300+00	388+80	Unsel-Izo association	Unsel	70	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MN3	397+30	660+00	Unsel-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN3	397+30	660+00	Unsel-Izo association	Unsel	70	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MN3	660+00	669+60	Unsel-Wardenot-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN3	660+00	669+60	Unsel-Wardenot-Izo association	Unsel	45	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MN3	660+00	669+60	Unsel-Wardenot-Izo association	Wardenot	30	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN3	669+60	694+20	Unsel-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	sr to gravelly loamy sand to extremely gravelly coarse sand
MN3	669+60	694+20	Unsel-Izo association	Unsel	70	H4	3.3	Yes	GP-GM, GW, GW-GM	extremely gravelly sand, very gravelly loamy sand, very gravelly sand
MN3	723+10	780+80	Annaw-Wardenot-Ardivey association	Ardivey	15	H3	3.8	Yes	GW, GW-GM	extremely gravelly loamy sand
MN3	723+10	780+80	Annaw-Wardenot-Ardivey association	Wardenot	25	H2	4.4	Yes	GM, GP-GM, GW-GM	sr to very gravelly fine sandy loam to extremely cobbly loamy sand
MN3	723+10	780+80	Annaw-Wardenot-Ardivey association	Annaw	45	H3	4.1	Yes	GM, GP-GM, GW-GM	sr to extremely gravelly loamy coarse sand to very gravelly loamy sand

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
S1	10134+30	10152+70	Rawe gravelly sandy loam, 4 to 15 percent slopes	Rawe	85	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S2	10134+30	10152+70	Rawe gravelly sandy loam, 4 to 15 percent slopes	Rawe	85	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S3	10000+00	10004+60	Trocken-Bluewing association	Bluewing	20	H2	4.4	Yes	GP-GM, GW, GW-GM	stratified very gravelly sand to extremely gravelly loamy coarse sand
S3	10004+60	10055+70	Perazzo-Rawe-Bluewing association	Perazzo	45	H4	3.2	Yes	GP-GM, GW, GW-GM	extremely gravelly loamy sand, extremely gravelly sand
S3	10004+60	10055+70	Perazzo-Rawe-Bluewing association	Rawe	25	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S3	10004+60	10055+70	Perazzo-Rawe-Bluewing association	Bluewing	20	H2	4.4	Yes	GP-GM, GW, GW-GM	stratified very gravelly sand to extremely gravelly loamy coarse sand
S3	10065+80	10075+10	Perazzo-Rawe-Bluewing association	Rawe	25	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S3	10065+80	10075+10	Perazzo-Rawe-Bluewing association	Bluewing	20	H2	4.4	Yes	GP-GM, GW, GW-GM	stratified very gravelly sand to extremely gravelly loamy coarse sand
S3	10065+80	10075+10	Perazzo-Rawe-Bluewing association	Perazzo	45	H4	3.2	Yes	GP-GM, GW, GW-GM	extremely gravelly loamy sand, extremely gravelly sand
S4	10135+40	10153+70	Rawe gravelly sandy loam, 4 to 15 percent slopes	Rawe	85	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S4	10696+90	10718+80	Rawe-Bluewing-Trocken association	Rawe	55	H3	4.1	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S4	10696+90	10718+80	Rawe-Bluewing-Trocken association	Bluewing	20	H2	4.4	Yes	GW-GM	stratified very gravelly sand to extremely gravelly loamy coarse sand
S4	10718+80	10728+40	Perazzo-Typic Torriorthents association	Perazzo	55	H4	3.2	Yes	GP-GM, GW, GW-GM	extremely gravelly loamy sand, extremely gravelly sand
S4	10791+10	10802+20	Rawe-Bluewing-Trocken association	Rawe	55	H3	4.1	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S4	10791+10	10802+20	Rawe-Bluewing-Trocken association	Bluewing	20	H2	4.4	Yes	GW-GM	stratified very gravelly sand to extremely gravelly loamy coarse sand
S4	10815+60	10825+30	Rawe-Bluewing-Trocken association	Rawe	55	H3	4.1	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S4	10815+60	10825+30	Rawe-Bluewing-Trocken association	Bluewing	20	H2	4.4	Yes	GW-GM	stratified very gravelly sand to extremely gravelly loamy coarse sand
S4	10834+00	10851+40	Rawe-Bluewing-Trocken association	Rawe	55	H3	4.1	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S4	10834+00	10851+40	Rawe-Bluewing-Trocken association	Bluewing	20	H2	4.4	Yes	GW-GM	stratified very gravelly sand to extremely gravelly loamy coarse sand
S4	11072+50	11108+50	Typic Torriorthents-Gynelle-Oricto association	Oricto	15	H4	3.8	Yes	GM, GP-GM, GW, GW-GM, SW-SM	stratified extremely gravelly coarse sand to very gravelly loamy sand

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
S4	11136+60	11187+20	Singatse-Gynelle-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
S4	11348+20	11366+00	Hawsley-Izo association	Izo	25	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
S5	10137+20	10151+80	Rawe gravelly sandy loam, 4 to 15 percent slopes	Rawe	85	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10180+20	10207+60	Rawe gravelly sandy loam, 4 to 15 percent slopes	Rawe	85	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10207+60	10224+90	Rawe-Malpais association	Rawe	60	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10241+60	10243+90	Rawe-Malpais association	Rawe	60	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10243+90	10268+00	Rawe complex, 2 to 4 percent slopes	Rawe	45	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10243+90	10268+00	Rawe complex, 2 to 4 percent slopes	Rawe	40	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10385+60	10386+60	Rawe gravelly sandy loam, 4 to 15 percent slopes	Rawe	85	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10760+50	10765+30	Rawe gravelly sandy loam, 4 to 15 percent slopes	Rawe	85	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10796+00	10825+40	Perazzo gravelly loam, 2 to 8 percent slopes	Perazzo	85	H4	3.2	Yes	GP-GM, GW, GW-GM	extremely gravelly loamy sand, extremely gravelly sand
S5	10829+50	10841+10	Perazzo gravelly loam, 2 to 8 percent slopes	Perazzo	85	H4	3.2	Yes	GP-GM, GW, GW-GM	extremely gravelly loamy sand, extremely gravelly sand
S5	10841+10	10887+70	Rawe-Malpais association	Rawe	60	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10887+70	10893+00	Rawe complex, 2 to 4 percent slopes	Rawe	45	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10887+70	10893+00	Rawe complex, 2 to 4 percent slopes	Rawe	40	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10893+60	10916+40	Rawe complex, 2 to 4 percent slopes	Rawe	40	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10893+60	10916+40	Rawe complex, 2 to 4 percent slopes	Rawe	45	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10923+90	10926+90	Rawe complex, 2 to 4 percent slopes	Rawe	40	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10923+90	10926+90	Rawe complex, 2 to 4 percent slopes	Rawe	45	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10935+80	10944+80	Rawe complex, 2 to 4 percent slopes	Rawe	45	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
S5	10935+80	10944+80	Rawe complex, 2 to 4 percent slopes	Rawe	40	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10949+20	10962+10	Rawe complex, 2 to 4 percent slopes	Rawe	45	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10949+20	10962+10	Rawe complex, 2 to 4 percent slopes	Rawe	40	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	10978+60	11002+20	Perazzo gravelly loam, 2 to 8 percent slopes	Perazzo	85	H4	3.2	Yes	GP-GM, GW, GW-GM	extremely gravelly loamy sand, extremely gravelly sand
S5	11002+20	11027+70	Rawe-Malpais association	Rawe	60	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	11027+70	11038+20	Rawe complex, 2 to 4 percent slopes	Rawe	45	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	11027+70	11038+20	Rawe complex, 2 to 4 percent slopes	Rawe	40	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S5	11038+20	11043+80	Perazzo gravelly loam, 2 to 8 percent slopes	Perazzo	85	H4	3.2	Yes	GP-GM, GW, GW-GM	extremely gravelly loamy sand, extremely gravelly sand
S5	11043+80	11070+30	Perazzo-Bluewing association	Bluewing	35	H2	4.4	Yes	GP-GM, GW, GW-GM	stratified very gravelly sand to extremely gravelly loamy coarse sand
S5	11043+80	11070+30	Perazzo-Bluewing association	Perazzo	50	H4	3.2	Yes	GP-GM, GW, GW-GM	extremely gravelly loamy sand, extremely gravelly sand
S5	11221+60	11224+80	Deefan-Cleaver-Bluewing association	Deefan	50	H4	2.8	Yes	GP-GM, GW, GW-GM	stratified extremely gravelly coarse sand to extremely gravelly sandy loam
S5	11221+60	11224+80	Deefan-Cleaver-Bluewing association	Cleaver	20	H4	3.1	Yes	GP-GM, GW, GW-GM	stratified extremely gravelly coarse sand to very gravelly sandy loam
S5	11221+60	11224+80	Deefan-Cleaver-Bluewing association	Bluewing	15	H2	4.4	Yes	GP-GM, GW, GW-GM	stratified very gravelly sand to extremely gravelly loamy coarse sand
S5	11266+20	11302+30	Typic Torriorthents-Gynelle-Oricto association	Oricto	15	H4	3.8	Yes	GM, GP-GM, GW, GW-GM, SW-SM	stratified extremely gravelly coarse sand to very gravelly loamy sand
S5	11330+40	11380+90	Singatse-Gynelle-Izo association	Izo	15	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
S5	11541+90	11559+70	Hawsley-Izo association	Izo	25	H2	4.3	Yes	GW, GW-GM	stratified extremely gravelly coarse sand to gravelly loamy sand
S6	10137+20	10151+80	Rawe gravelly sandy loam, 4 to 15 percent slopes	Rawe	85	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S6	10180+20	10207+60	Rawe gravelly sandy loam, 4 to 15 percent slopes	Rawe	85	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S6	10207+60	10224+90	Rawe-Malpais association	Rawe	60	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S6	10241+60	10243+90	Rawe-Malpais association	Rawe	60	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
S6	10243+90	10268+00	Rawe complex, 2 to 4 percent slopes	Rawe	40	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S6	10243+90	10268+00	Rawe complex, 2 to 4 percent slopes	Rawe	45	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S6	10385+60	10386+60	Rawe gravelly sandy loam, 4 to 15 percent slopes	Rawe	85	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S6	10760+50	10765+30	Rawe gravelly sandy loam, 4 to 15 percent slopes	Rawe	85	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S6	10796+30	10815+70	Perazzo gravelly loam, 2 to 8 percent slopes	Perazzo	85	H4	3.2	Yes	GP-GM, GW, GW-GM	extremely gravelly loamy sand, extremely gravelly sand
S6	10832+80	10869+50	Rawe-Malpais association	Rawe	60	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S6	10869+50	10894+00	Rawe-Malpais association	Rawe	60	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S6	10894+00	10923+00	Rawe-Malpais association	Rawe	60	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S6	10947+30	10959+20	Rawe-Malpais association	Rawe	60	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S6	10959+20	10959+20	Rawe-Malpais association	Rawe	60	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S6	10959+20	10959+20	Rawe-Malpais association	Rawe	60	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S6	10959+20	10964+90	Rawe-Malpais association	Rawe	60	H3	4.2	Yes	GM, GP, GP-GM, GW-GM	stratified extremely gravelly coarse sandy loam to very gravelly sandy loam
S6	11151+50	11157+20	Bluewing-Inmo association	Bluewing	45	H2	4.4	Yes	GP-GM, GW-GM	stratified very gravelly sand to extremely gravelly loamy coarse sand
S6	11161+60	11173+90	Bluewing-Inmo association	Bluewing	45	H2	4.4	Yes	GP-GM, GW-GM	stratified very gravelly sand to extremely gravelly loamy coarse sand
S6	11232+30	11244+60	Bluewing-Inmo association	Bluewing	45	H2	4.4	Yes	GP-GM, GW-GM	stratified very gravelly sand to extremely gravelly loamy coarse sand
S6	11277+70	11279+10	Bluewing-Inmo association	Bluewing	45	H2	4.4	Yes	GP-GM, GW-GM	stratified very gravelly sand to extremely gravelly loamy coarse sand
S6	11282+00	11284+00	Bluewing-Inmo association	Bluewing	45	H2	4.4	Yes	GP-GM, GW-GM	stratified very gravelly sand to extremely gravelly loamy coarse sand
S6	11288+90	11320+60	Bluewing-Inmo association	Bluewing	45	H2	4.4	Yes	GP-GM, GW-GM	stratified very gravelly sand to extremely gravelly loamy coarse sand
S6	11320+60	11375+10	Rednik-Trocken-Bluewing association	Bluewing	20	H2	4.4	Yes	GP-GM, GW-GM	stratified very gravelly sand to extremely gravelly loamy coarse sand
S6	11375+10	11406+50	Rednik-Trocken-Bluewing association	Bluewing	20	H2	4.4	Yes	GW-GM	stratified very gravelly sand to extremely gravelly loamy coarse sand

TABLE 6
SUMMARY OF POTENTIAL GRAVEL SOURCES

Alignment Segment	From Station	To Station	SSURGO Map Unit Name	Component Name	Component Percentage	Horizon Name	Thickness (feet)	At Bottom[1]	USCS Classification(s)	Texture Description(s)
S6	11375+10	11406+50	Rednik-Trocken-Bluewing association	Rednik	40	H4	3.6	Yes	GM, GP-GM, GW, GW-GM, SW-SM	extremely gravelly loamy coarse sand, extremely gravelly loamy sand, very gravelly sand

Note:
[1] Column "At Bottom" indicates whether bottom depth of soil layer is at maximum depth (typically 5 feet) of recorded SSURGO data.

TABLE 7
RECOMMENDED BALLAST SOURCE AREAS

ROCK TYPE	QUARRY NAME	GEOGRAPHIC AREA/LOCATION	MILES FROM ALIGNMENT	FIELD VISIT	FINAL CANDIDATE
BASALT	Malpais Mesa South	Goldfield Hills; 2 Miles Southeast of Goldfield	2 to 3	Y	Y
GRANITE	North Clayton	North end of Clayton Ridge; 9 Miles West of Goldfield	0 to 1	Y	Y
GRANITE	Gabbs Range	Soda Spring Valley; 3 miles east of Luning	0 to 1	Y	Y
BASALT	Garfield Hills	Soda Spring Valley; 9 miles east of Hawthorne	1 to 2	Y	Y
GRANITE	Weber Dam	White Mountain; 7 miles Northwest of Schurz	1 to 2	Y	Y

NOTES:
See Ballast Quarry Report (Shannon & Wilson, Inc., 2007a) for additional quarry site selection information.

PHOTO: MT1026_ALG_0064_07Oct06.jpg

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PHOTOGRAPH
POTENTIAL BALLAST SOURCE
GRANITE

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FIG. 1

Filename: 21-1-20102-222_Fig-1_Potential-Ballast-Soucre_Granite.mxd Created Using: ArcMap 9.2 Date Printed: 25-Jul-07 BRL

PHOTO: MT3025_WTL_0333_16Nov06.jpg

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PHOTOGRAPH
POTENTIAL BALLAST SOURCE
BASALT

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FIG. 2

Filename: 21-1-20102-222_Fig-2_Potential-Ballast-Soucre_Basalt.mxd Created Using: ArcMap 9.2 Date Printed: 25-Jul-07 BRL

PHOTO: MT1051_ALG_0153_09Oct06.jpg

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PHOTOGRAPH
TYPICAL NDOT BORROW PIT

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FIG. 3

Filename: 21-1-20102-222_Fig-3_Typical-NDOT-Borrow-Pit.mxd Created Using: ArcMap 9.2 Date Printed: 25-Jul-07 BRL

PHOTO: MT2020_WTL_0086_07Oct06.jpg

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PHOTOGRAPH
NDOT BORROW PIT ES 02-11
NEAR LONE MOUNTAIN

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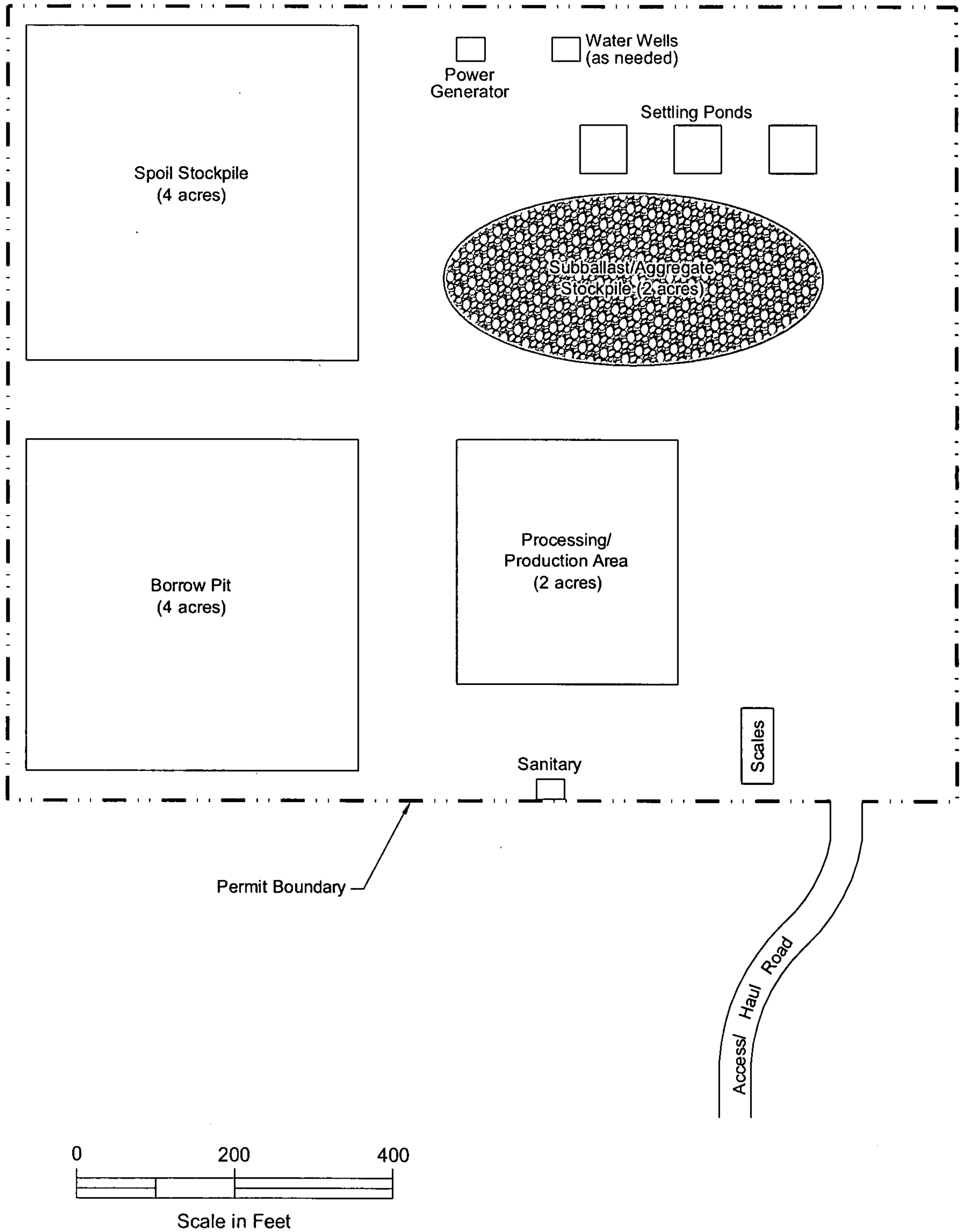
FIG. 4



NOTE

This layout is one possible concept of a subballast/aggregate production site. The actual size and arrangement of components will depend on site geologic and topographic conditions, volume of material to be processed, and contractor's operational preferences.

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CONCEPTUAL SUBBALLAST/ AGGREGATE PRODUCTION SITE LAYOUT

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FIG. 5

Filename: J:\211\20102-222\21-1-20102-222 Fig 5.dwg Print Date: 07-25-2007 Login: SAC

PHOTO: MT1055_SMP_0100_10Oct06.jpg

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PHOTOGRAPH
TYPICAL CHANNEL ALLUVIUM

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FIG. 6

PHOTO: MT1008_ALG_0014_05Oct06.jpg

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PHOTOGRAPH
TYPICAL YOUNG ALLUVIUM

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FIG. 7

Filename: 21-1-20102-222_Fig7_Typical-Young-Alluvium.mxd Created Using: ArcMap 9.2 Date Printed: 25-Jul-07 BRL

Filename: 21-1-20102-222_Fig-8_Young-Alluvim-Interbedded-Quaternary-Lake-Beds.mxd   Created Using: ArcMap 9.2   Date Printed: 25-Jul-07   BRL

PHOTO: MT7074_WTL_0453_23Feb07.jpg

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PHOTOGRAPH
YOUNG ALLUVIUM INTERBEDDED WITH QUATERNARY LAKE BEDS

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FIG. 8

PHOTO: MT1083_ALG_0262_13Oct06.jpg

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PHOTOGRAPH
TYPICAL OLD ALLUVIUM

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FIG. 9

PHOTO: MT3045_WTL_0223_09Oct06.jpg

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PHOTOGRAPH
TYPICAL OLD ALLUVIUM
WITH CALICHE LENSES

21-1-20102-222

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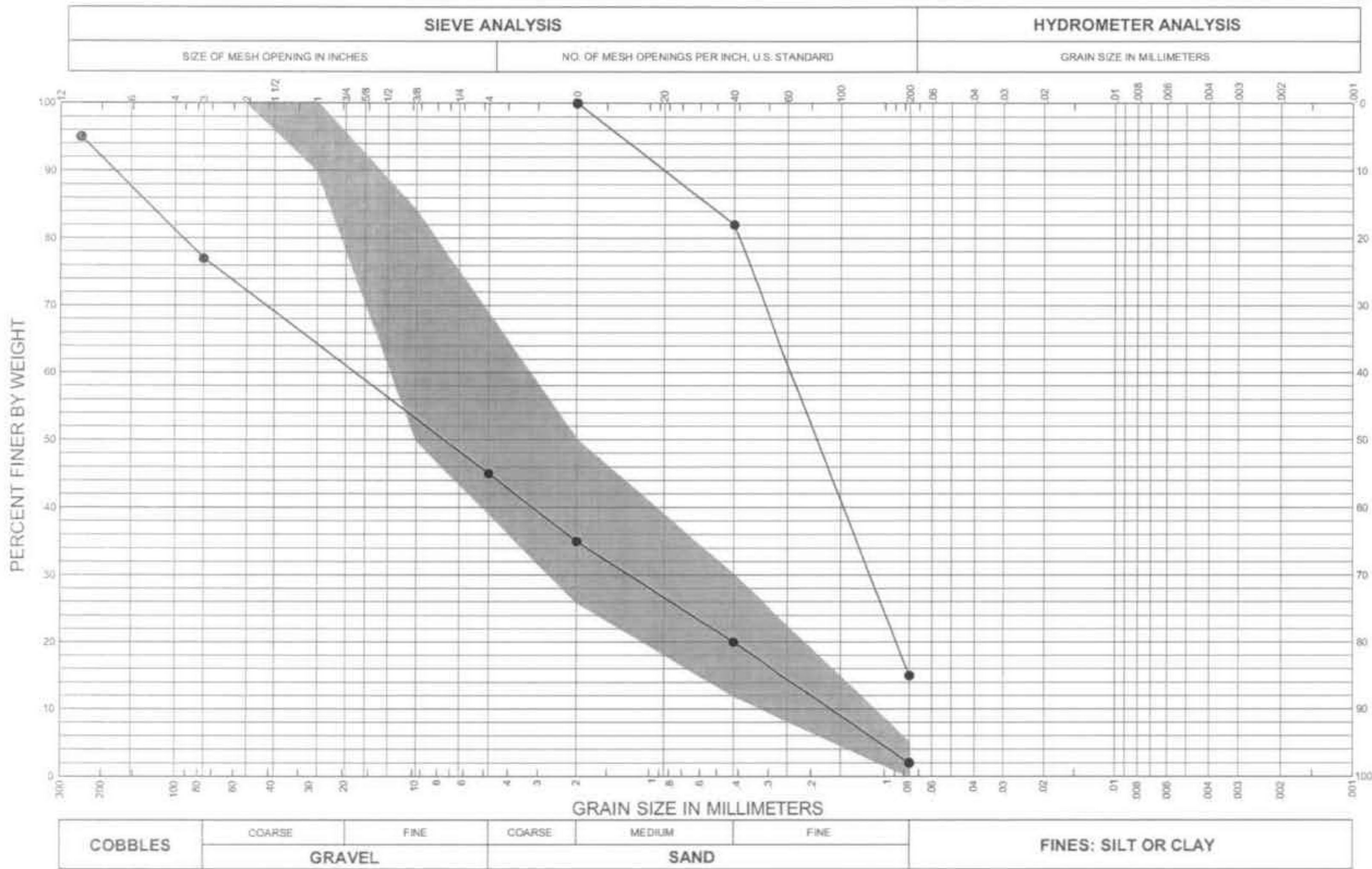
FIG.10



SAMPLE DESCRIPTION

Typical Subballast Gradation

Envelope of Potential Sand Sources from SSURGO Database

Yucca Mountain Project
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GRAIN SIZE DISTRIBUTION POTENTIAL SAND SOURCES

21-1-20102-222

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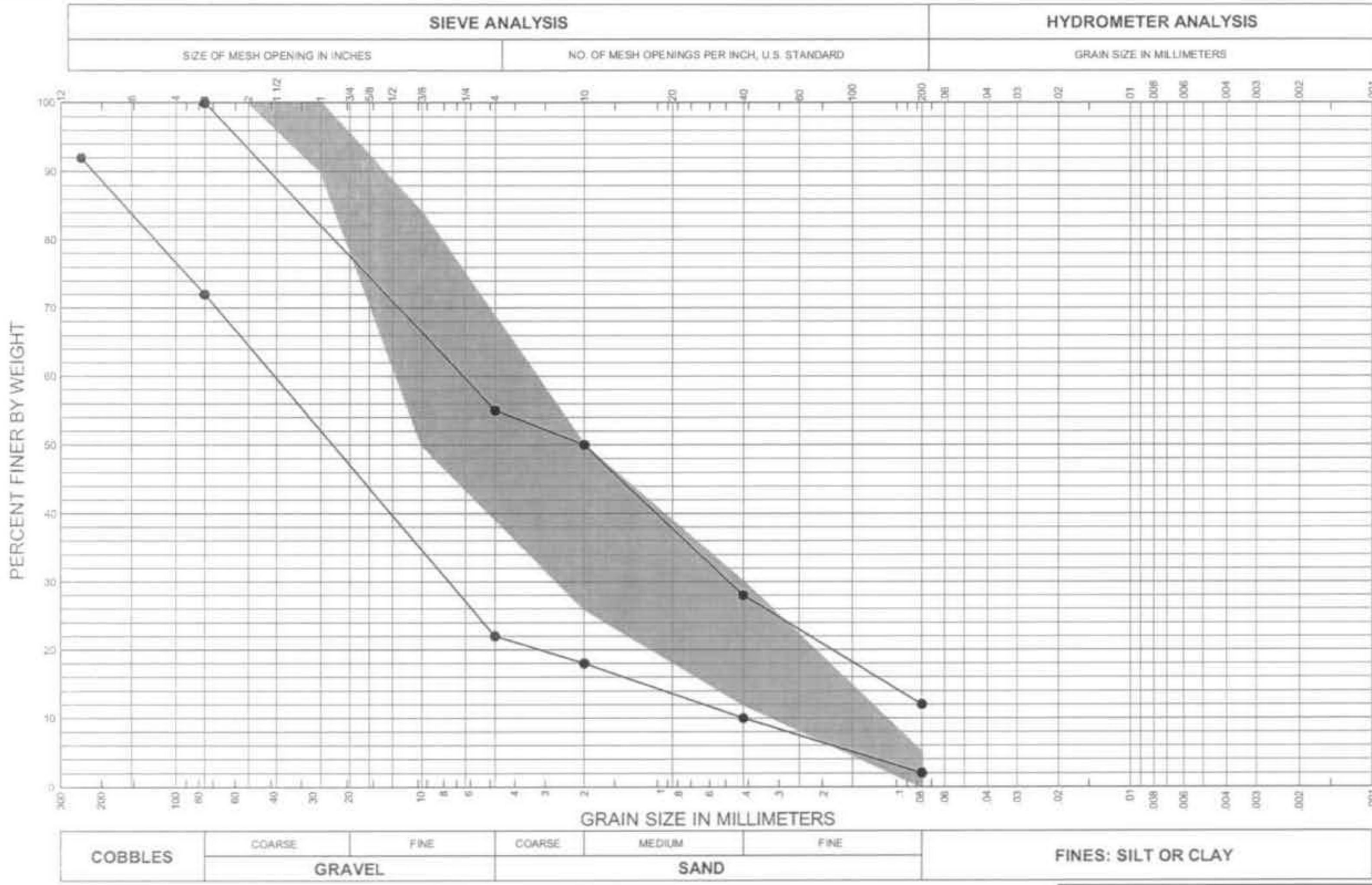
FIG. 11

FIG. 11

Filename: J:\211\20102-222\21-1-20102-222 Grain Size Distributions (Date Printed: 25 July 07).dwg Layout: Potential Gravel Sources Login: SAC



SAMPLE DESCRIPTION

Typical Subballast Gradation

Envelope of Potential Gravel Sources from SSURGO Database

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GRAIN SIZE DISTRIBUTION POTENTIAL GRAVEL SOURCES

21-1-20102-222

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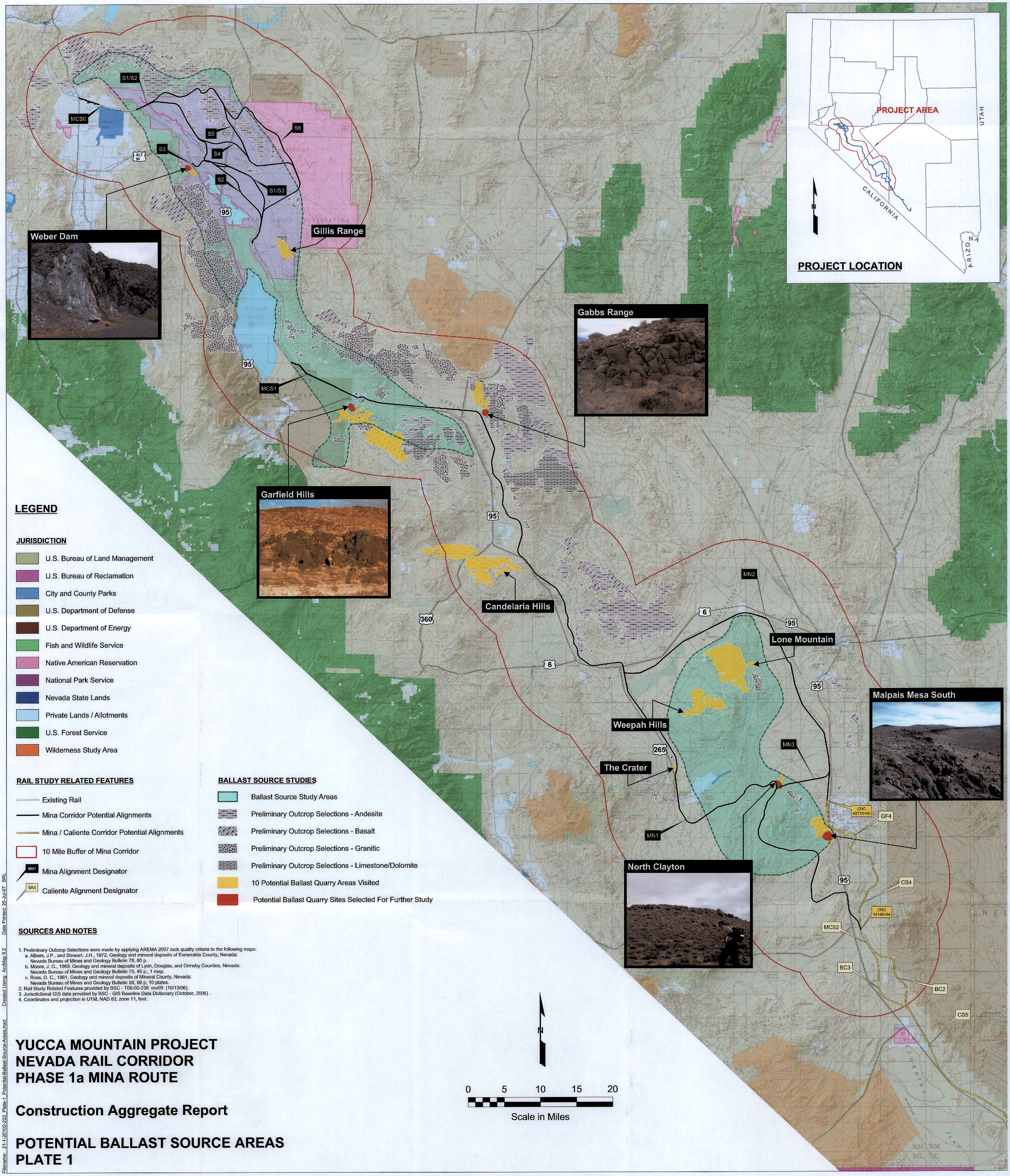
FIG. 12

FIG. 12



LEGEND

JURISDICTION

- U.S. Bureau of Land Management
- U.S. Bureau of Reclamation
- City and County Parks
- U.S. Department of Defense
- U.S. Department of Energy
- Fish and Wildlife Service
- Native American Reservation
- National Park Service
- Nevada State Lands
- Private Lands / Allotments
- U.S. Forest Service
- Wilderness Study Area

RAIL STUDY RELATED FEATURES

- Existing Rail
- Mina Corridor Potential Alignments
- Mina / Caliente Corridor Potential Alignments
- 10 Mile Buffer of Mina Corridor
- MN1 Mina Alignment Designator
- SR3 Caliente Alignment Designator

BALLAST SOURCE STUDIES

- Ballast Source Study Areas
- Preliminary Outcrop Selections - Andesite
- Preliminary Outcrop Selections - Basalt
- Preliminary Outcrop Selections - Granitic
- Preliminary Outcrop Selections - Limestone/Dolomite
- 10 Potential Ballast Quarry Areas Visited
- Potential Ballast Quarry Sites Selected For Further Study

SOURCES AND NOTES

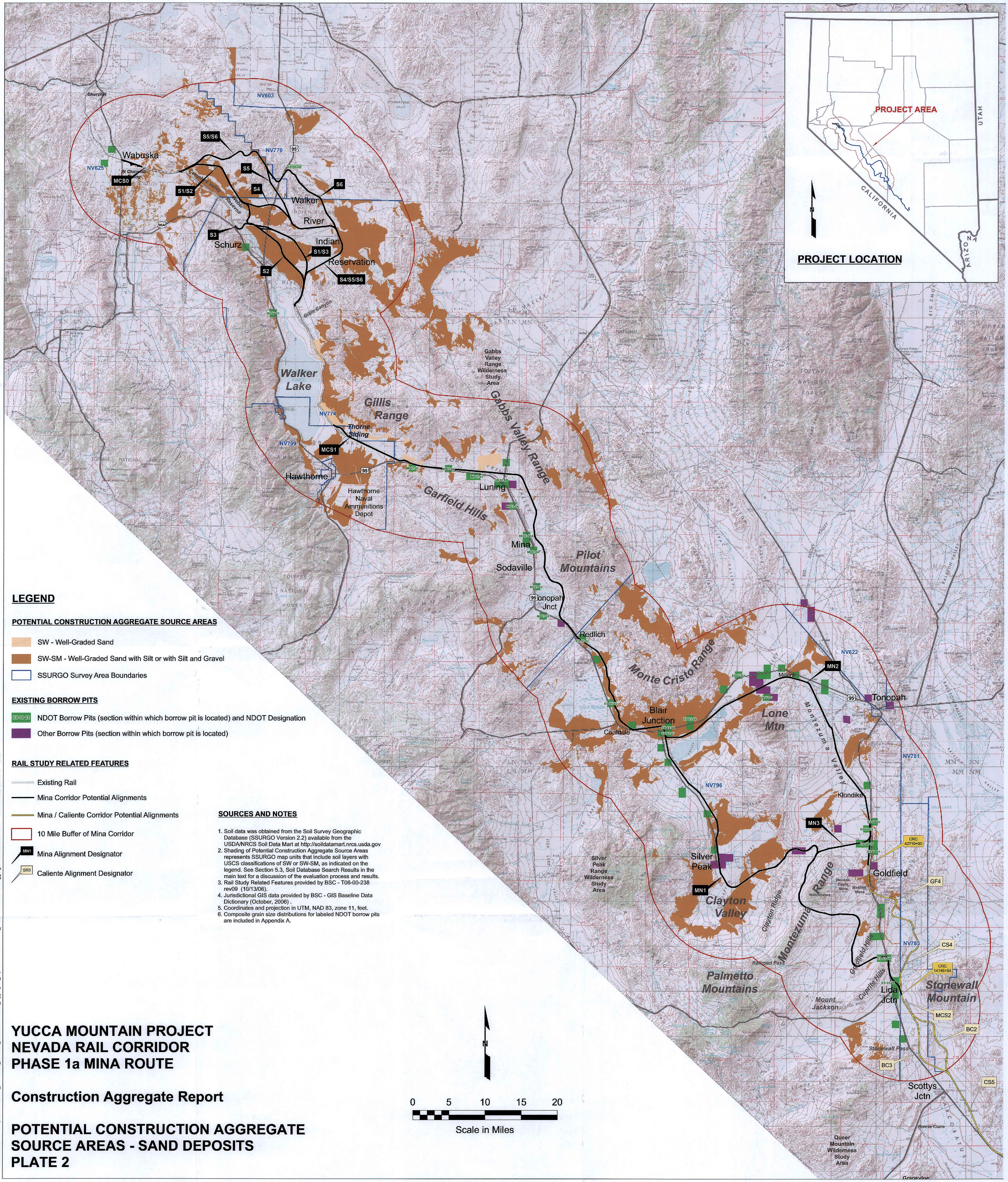
1. Preliminary Outcrop Selections were made by applying AREMA 2007 rock quality criteria to the following maps:
   a. Albers, J.P., and Stewart, J.H., 1972, Geology and mineral deposits of Esmeralda County, Nevada: Nevada Bureau of Mines and Geology Bulletin 78, 80 p.
   b. Moore, J. G., 1969, Geology and mineral deposits of Lyon, Douglas, and Ormsby Counties, Nevada: Nevada Bureau of Mines and Geology Bulletin 75, 45 p., 1 map.
   c. Ross, D. C., 1961, Geology and mineral deposits of Mineral County, Nevada: Nevada Bureau of Mines and Geology Bulletin 58, 98 p, 10 plates.
2. Rail Study Related Features provided by BSC - T06-00-238 rev09 (10/13/06).
3. Jurisdictional GIS data provided by BSC - GIS Baseline Data Dictionary (October, 2006) .
4. Coordinates and projection in UTM, NAD 83, zone 11, feet.

YUCCA MOUNTAIN PROJECT
NEVADA RAIL CORRIDOR
PHASE 1a MINA ROUTE

Construction Aggregate Report

POTENTIAL BALLAST SOURCE AREAS
PLATE 1

Filename: 21-1-20102-222_Plate-1_Potential-Ballast-Source-Areas.mxd Created Using: ArcMap 9.2 Date Printed: 25-Jul-07 BRL



LEGEND

POTENTIAL CONSTRUCTION AGGREGATE SOURCE AREAS

- SW - Well-Graded Sand
- SW-SM - Well-Graded Sand with Silt or with Silt and Gravel
- SSURGO Survey Area Boundaries

EXISTING BORROW PITS

- ES 05-02 NDOT Borrow Pits (section within which borrow pit is located) and NDOT Designation
- Other Borrow Pits (section within which borrow pit is located)

RAIL STUDY RELATED FEATURES

- Existing Rail
- Mina Corridor Potential Alignments
- Mina / Caliente Corridor Potential Alignments
- 10 Mile Buffer of Mina Corridor
- MN1 Mina Alignment Designator
- SR3 Caliente Alignment Designator

SOURCES AND NOTES

1. Soil data was obtained from the Soil Survey Geographic Database (SSURGO Version 2.2) available from the USDA/NRCS Soil Data Mart at http://soildatamart.nrcs.usda.gov
2. Shading of Potential Construction Aggregate Source Areas represents SSURGO map units that include soil layers with USCS classifications of SW or SW-SM, as indicated on the legend. See Section 5.3, Soil Database Search Results in the main text for a discussion of the evaluation process and results.
3. Rail Study Related Features provided by BSC - T06-00-238 rev09 (10/13/06).
4. Jurisdictional GIS data provided by BSC - GIS Baseline Data Dictionary (October, 2006) .
5. Coordinates and projection in UTM, NAD 83, zone 11, feet.
6. Composite grain size distributions for labeled NDOT borrow pits are included in Appendix A.

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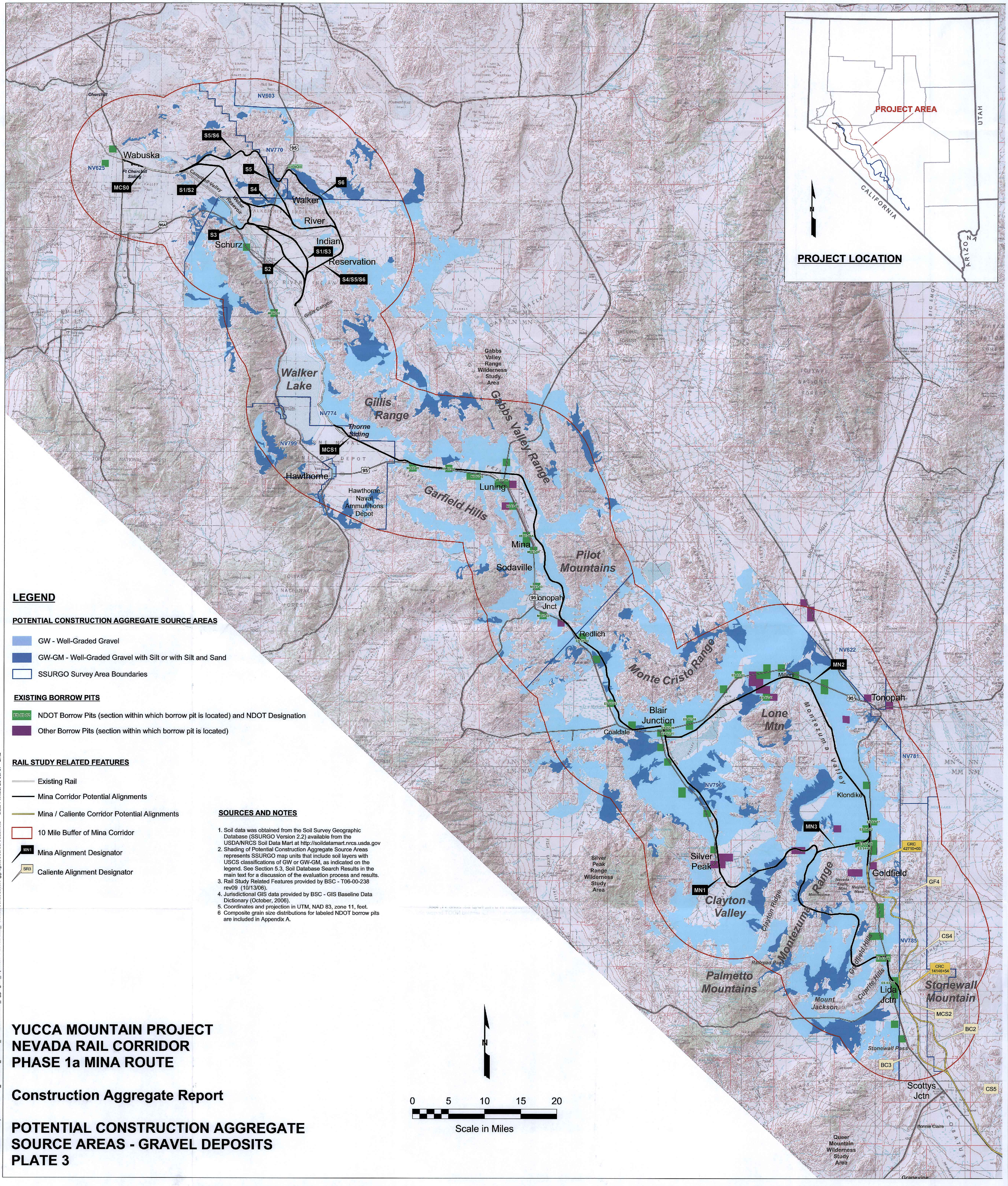
NEVADA RAIL CORRIDOR
PHASE 1a MINA ROUTE

Construction Aggregate Report

POTENTIAL CONSTRUCTION AGGREGATE SOURCE AREAS - SAND DEPOSITS
PLATE 2

Filename: T:\Project\21-1\20102_Yucca\200_Mina\AV_mxd\Construction_Aggregate_report\21-1-20102-222_PotentialConstructionAggregateSourceAreas.mxd Date Printed: 25-Jul-07 BRL



SOURCES AND NOTES

1. Soil data was obtained from the Soil Survey Geographic Database (SSURGO Version 2.2) available from the USDA/NRCS Soil Data Mart at http://soildatamart.nrcs.usda.gov
2. Shading of Potential Construction Aggregate Source Areas represents SSURGO map units that include soil layers with USCS classifications of GW or GW-GM, as indicated on the legend. See Section 5.3, Soil Database Search Results in the main text for a discussion of the evaluation process and results.
3. Rail Study Related Features provided by BSC - T06-00-238 rev09 (10/13/06).
4. Jurisdictional GIS data provided by BSC - GIS Baseline Data Dictionary (October, 2006).
5. Coordinates and projection in UTM, NAD 83, zone 11, feet.
6 Composite grain size distributions for labeled NDOT borrow pits are included in Appendix A.

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Construction Aggregate Report

POTENTIAL CONSTRUCTION AGGREGATE SOURCE AREAS - GRAVEL DEPOSITS
PLATE 3

APPENDIX A

NDOT BORROW PIT GRAIN SIZE CURVES

APPENDIX A

NDOT BORROW PIT GRAIN SIZE CURVES

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A-5	Grain Size Distribution NDOT Borrow Pit ES 02-08
A-6	Grain Size Distribution NDOT Borrow Pit ES 02-11
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A-17	Grain Size Distribution NDOT Borrow Pit MI 01-04
A-18	Grain Size Distribution NDOT Borrow Pit MI 01-06A
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A-21	Grain Size Distribution NDOT Borrow Pit MI 01-09B
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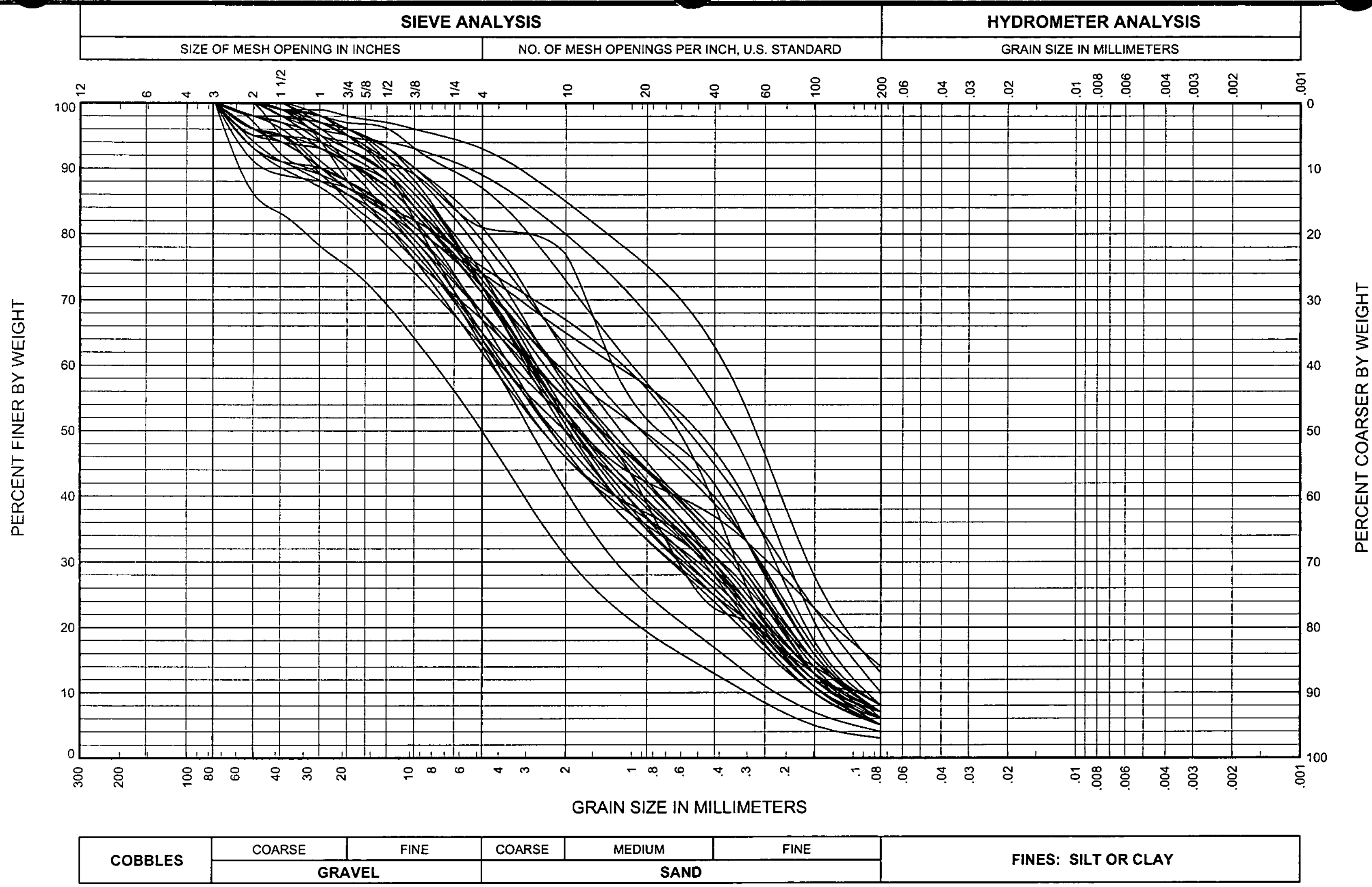
A-23	Grain Size Distribution NDOT Borrow Pit MI 02-04
A-24	Grain Size Distribution NDOT Borrow Pit MI 02-05
A-25	Grain Size Distribution NDOT Borrow Pit MI 04-01



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GRAIN SIZE DISTRIBUTION NDOT MATERIAL SITE CH 08-04

21-1-20102-222

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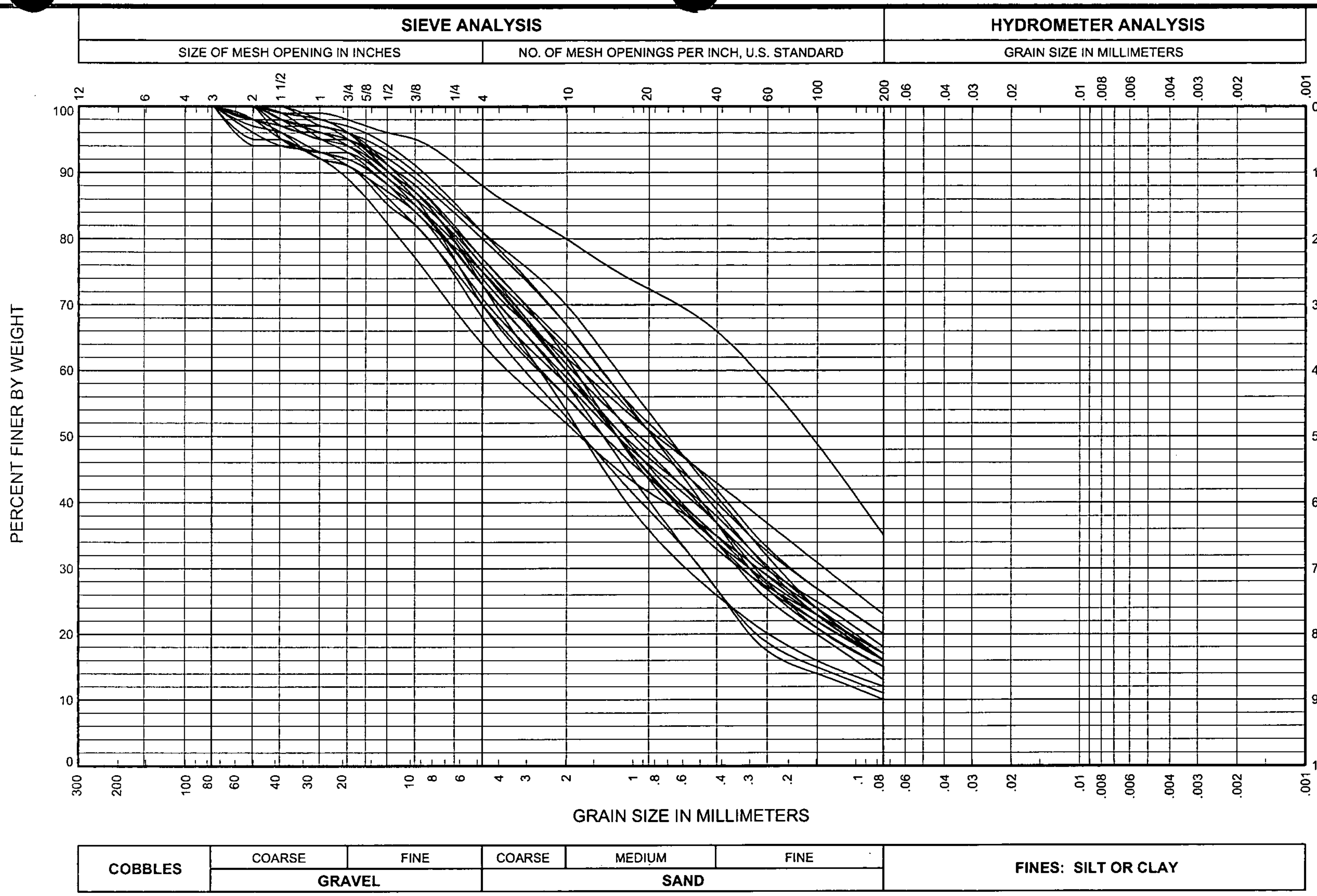
FIG. A-1

GSASUM_MANY 21-20102.GPJ SHAN_WIL.GDT Date Printed: 25-Jul-07

FIG. A-1



GSASUM_MANY 21-20102.GPJ SHAN_WIL.GDT Date Printed: 25-Jul-07

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Phase 1a Mina Route

GRAIN SIZE DISTRIBUTION
NDOT MATERIAL SITE ES 02-03

21-1-20102-222

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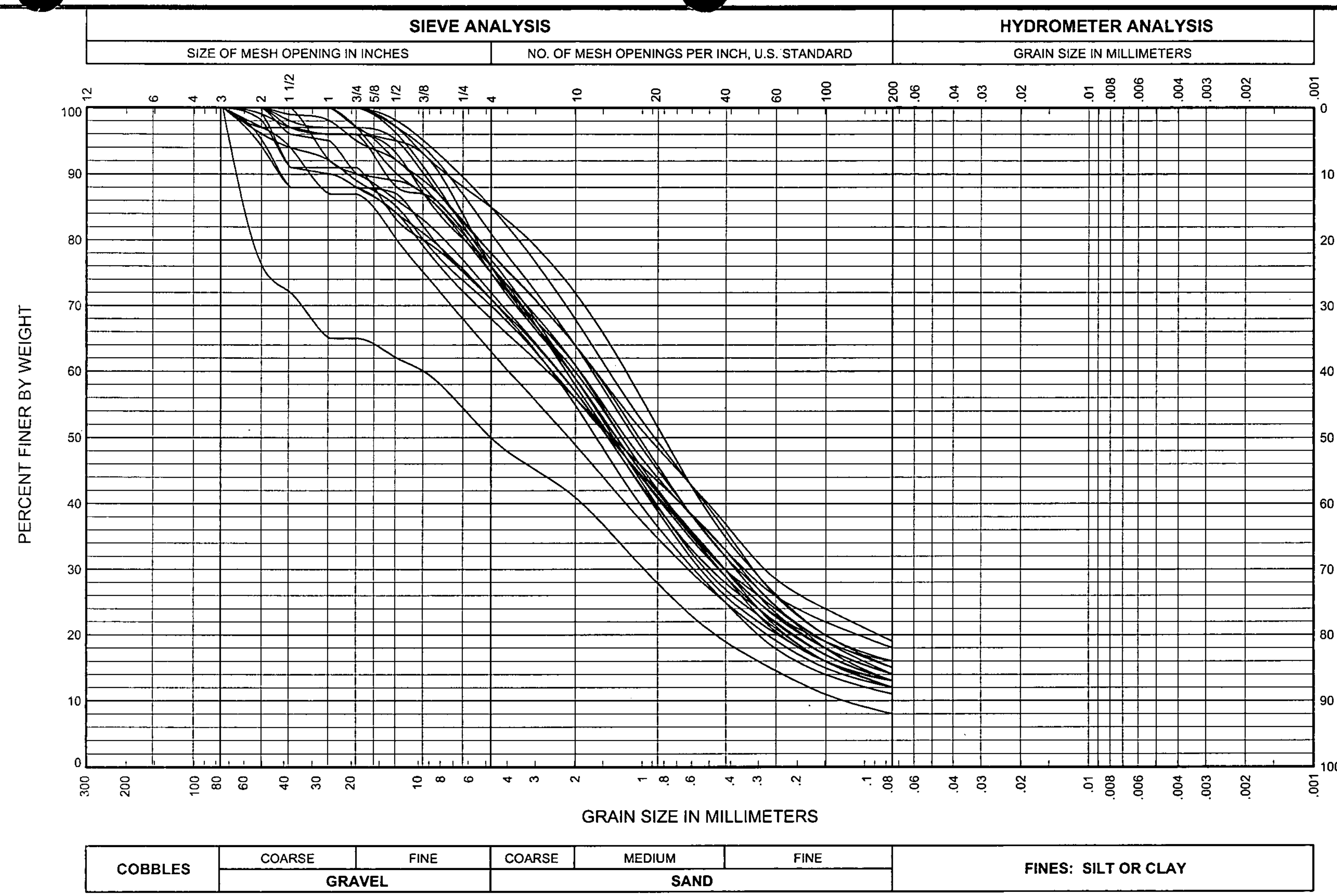
FIG. A-2

FIG. A-2



GSASUM_MANY 21-20102.GPJ SHAN_WIL.GDT Date Printed: 25-Jul-07

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Phase 1a Mina Route

GRAIN SIZE DISTRIBUTION
NDOT MATERIAL SITE ES 02-06

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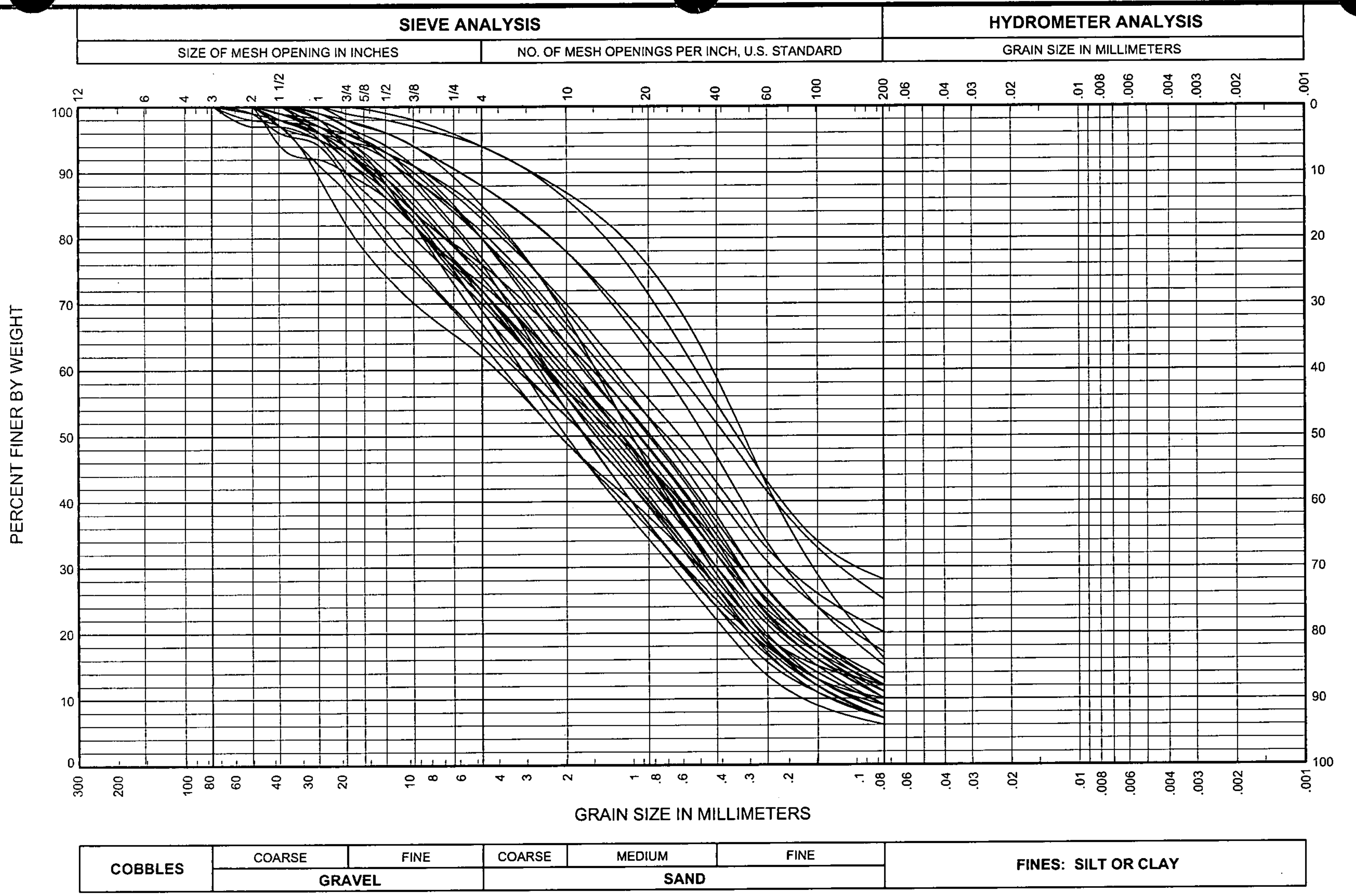
FIG. A-3

FIG. A-3



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GRAIN SIZE DISTRIBUTION
NDOT MATERIAL SITE ES 02-07

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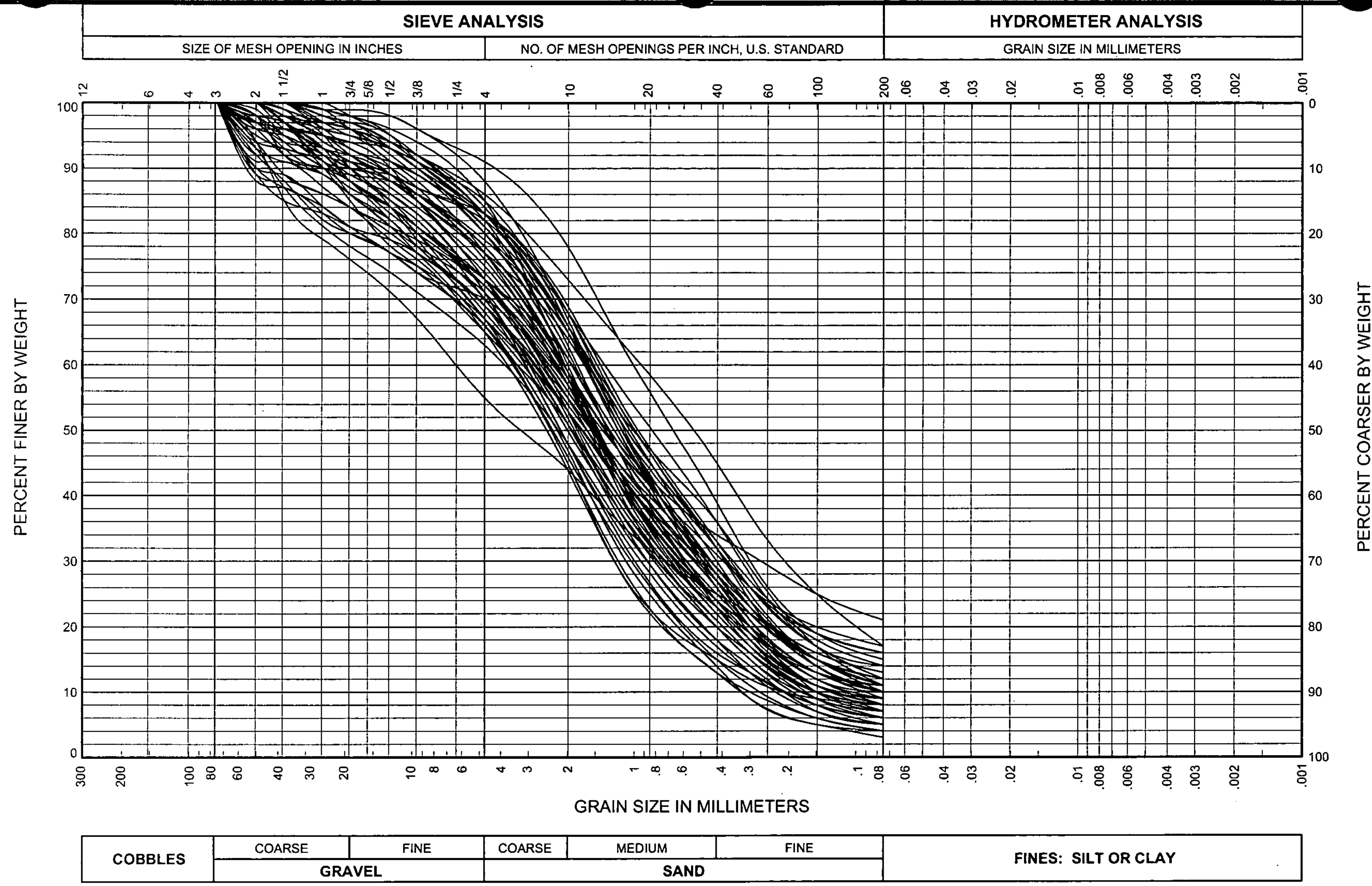
FIG. A-4

FIG. A-4



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GRAIN SIZE DISTRIBUTION NDOT MATERIAL SITE ES 02-08

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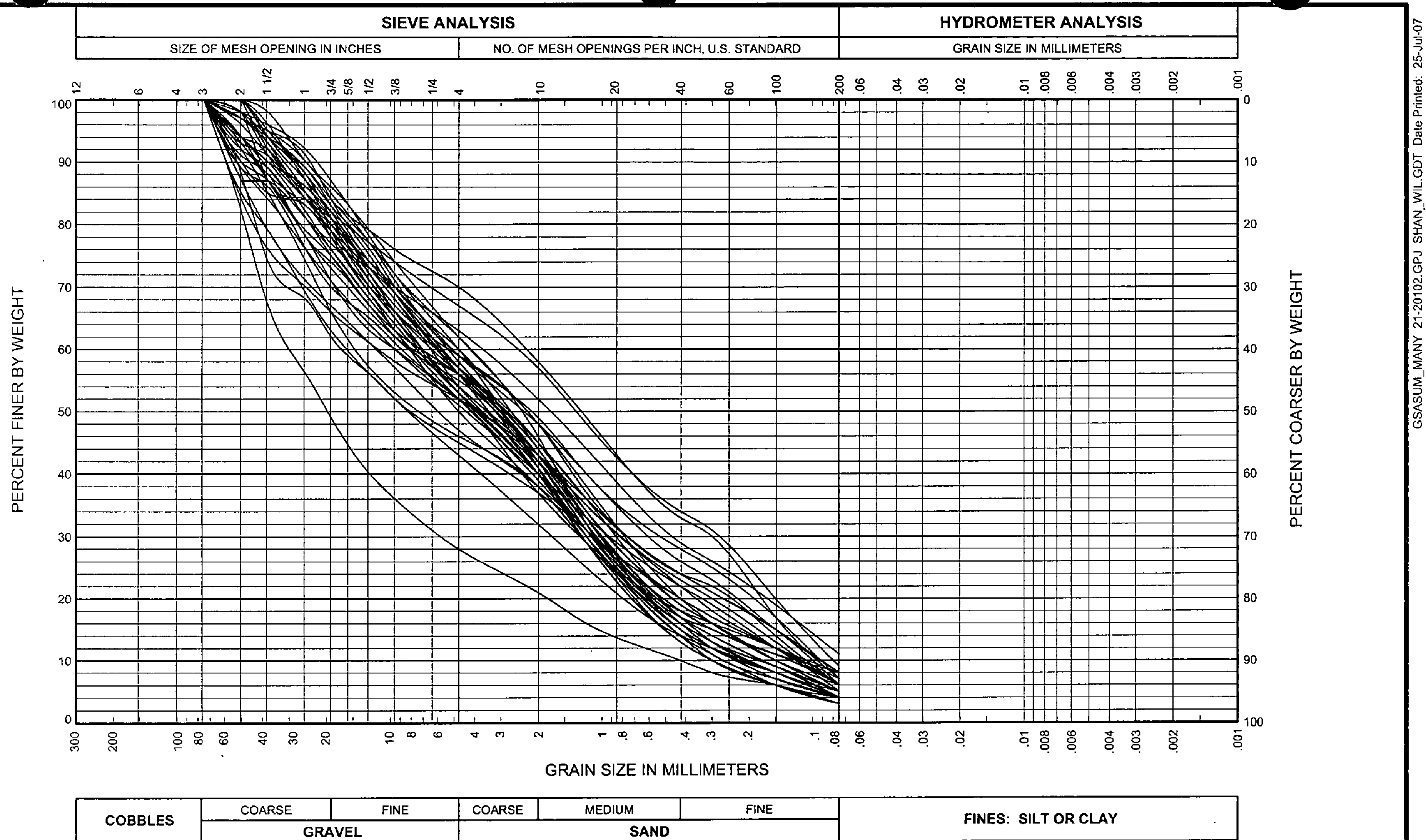
FIG. A-5

FIG. A-5



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Phase 1a Mina Route

GRAIN SIZE DISTRIBUTION
NDOT MATERIAL SITE ES 02-11

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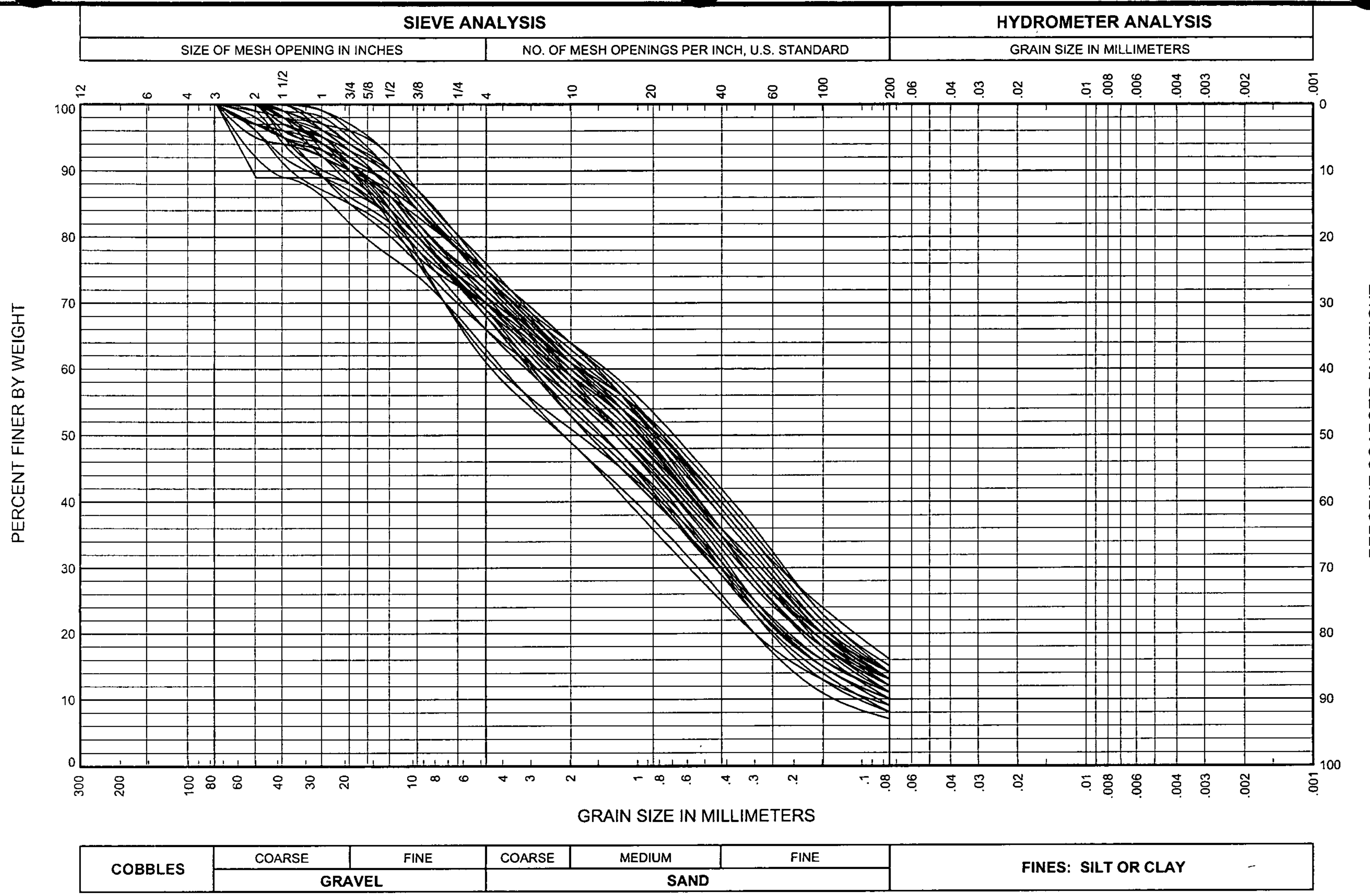
FIG. A-6

FIG. A-6



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GRAIN SIZE DISTRIBUTION NDOT MATERIAL SITE ES 03-06

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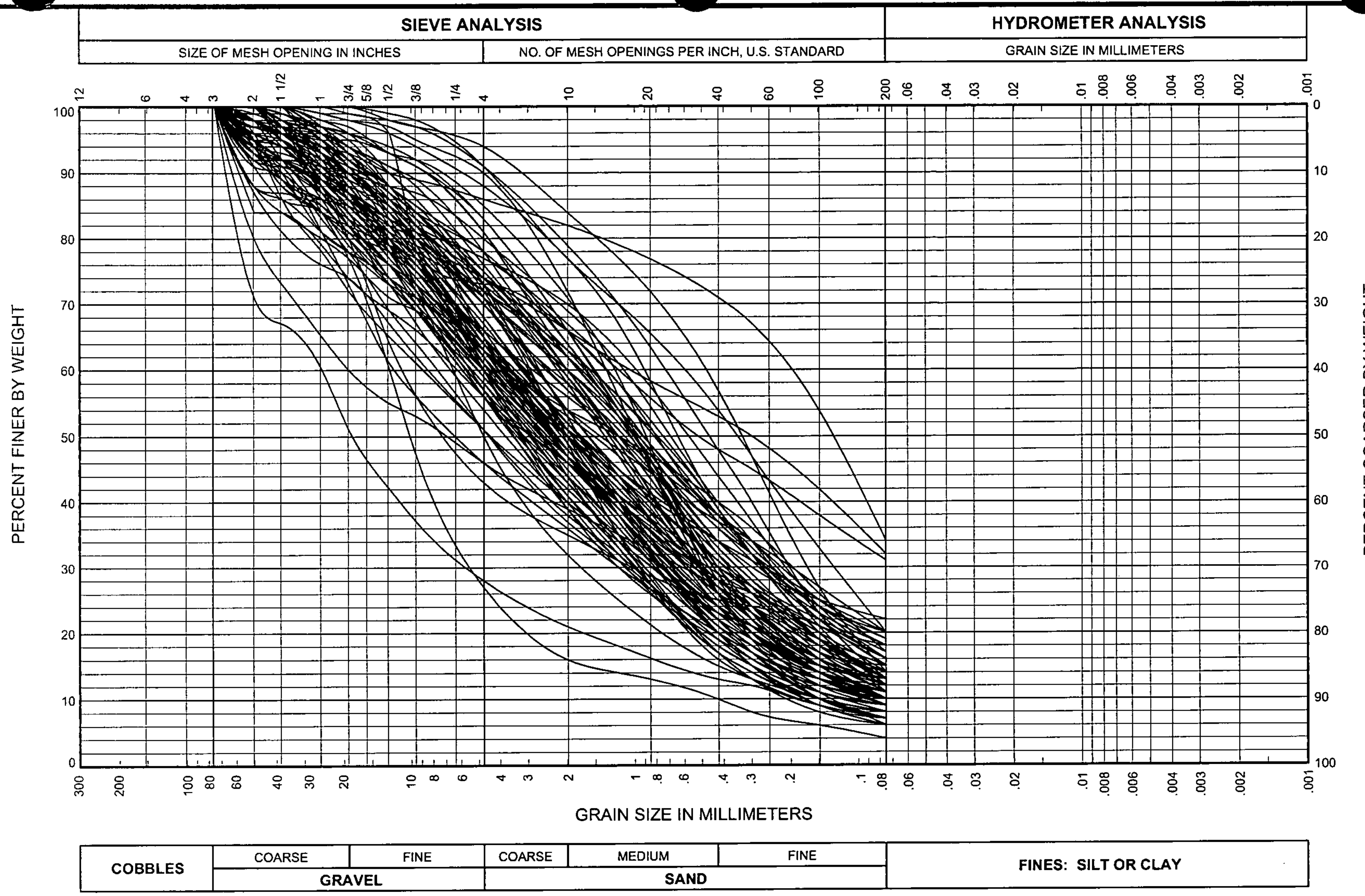
FIG. A-7

FIG. A-7



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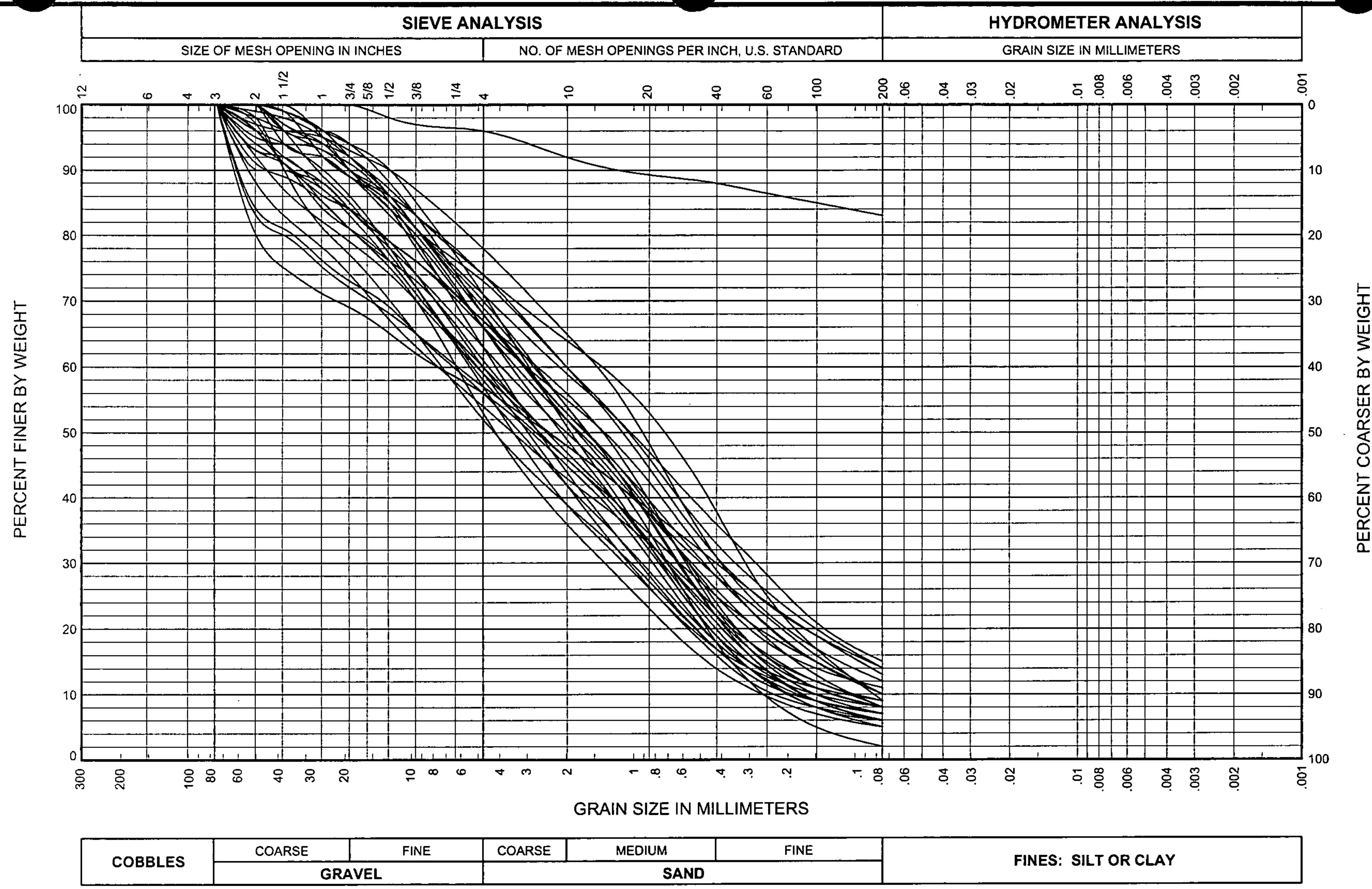
GRAIN SIZE DISTRIBUTION NDOT MATERIAL SITE ES 03-08
21-1-20102-222
SHANNON & WILSON, INC. Geotechnical and Environmental Consultants — **FIG. A-8**

FIG. A-8



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GRAIN SIZE DISTRIBUTION
NDOT MATERIAL SITE ES 04-01

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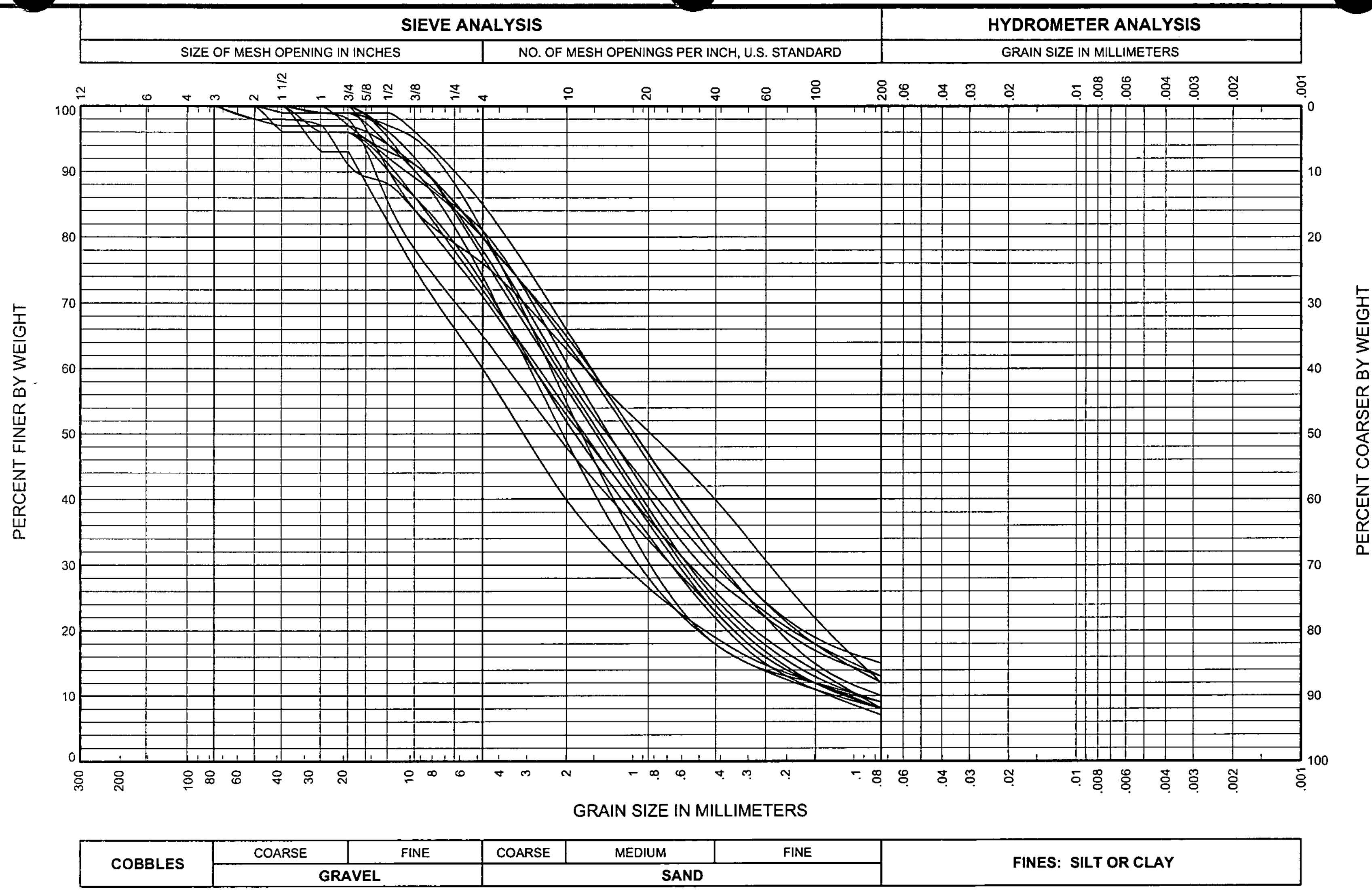
FIG. A-9

FIG. A-9



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GRAIN SIZE DISTRIBUTION
NDOT MATERIAL SITE ES 04-02

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FIG. A-10

FIG. A-10

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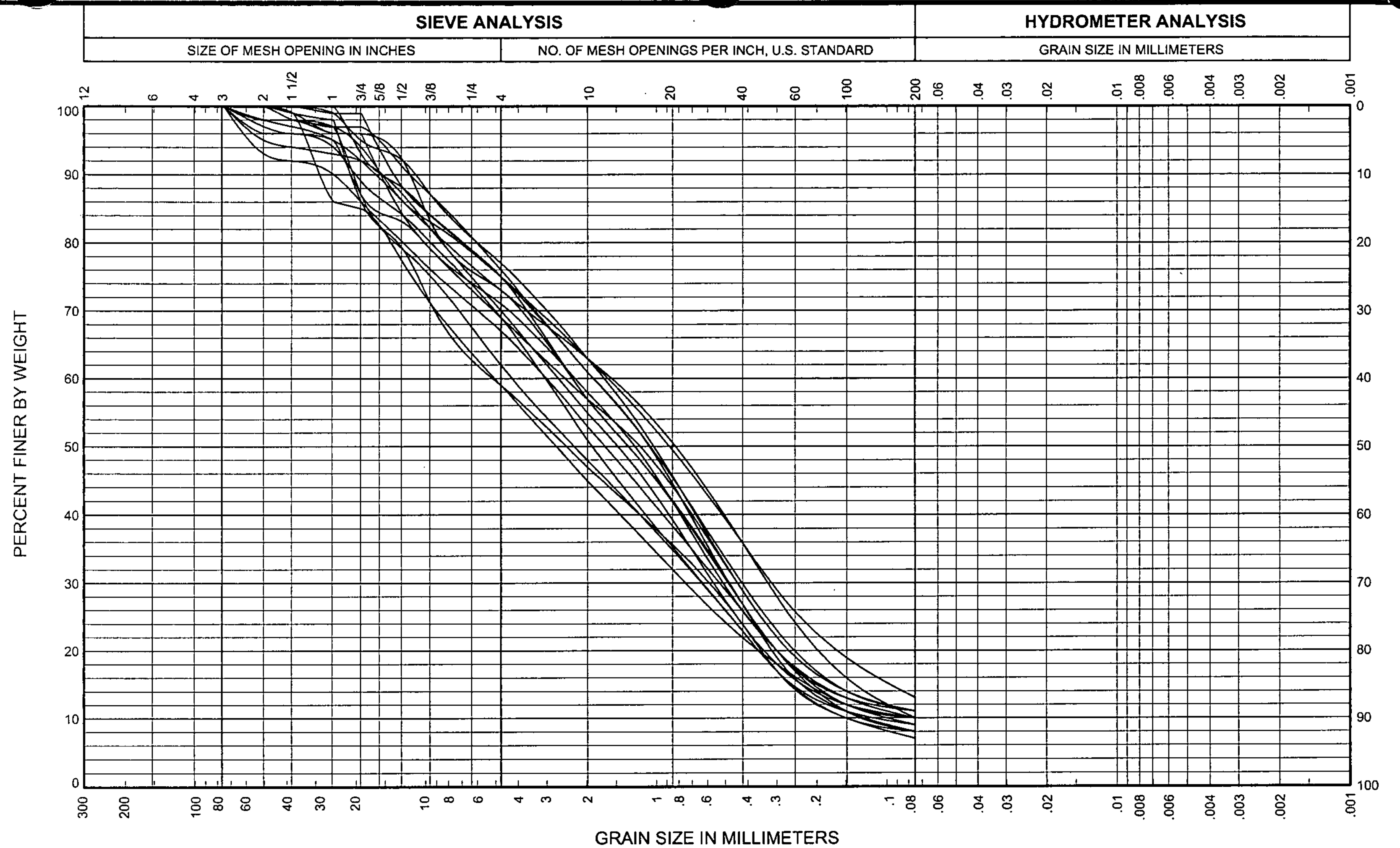

COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	FINES: SILT OR CLAY
	GRAVEL		SAND			

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GRAIN SIZE DISTRIBUTION
NDOT MATERIAL SITE ES 04-07

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FIG. A-11

FIG. A-11

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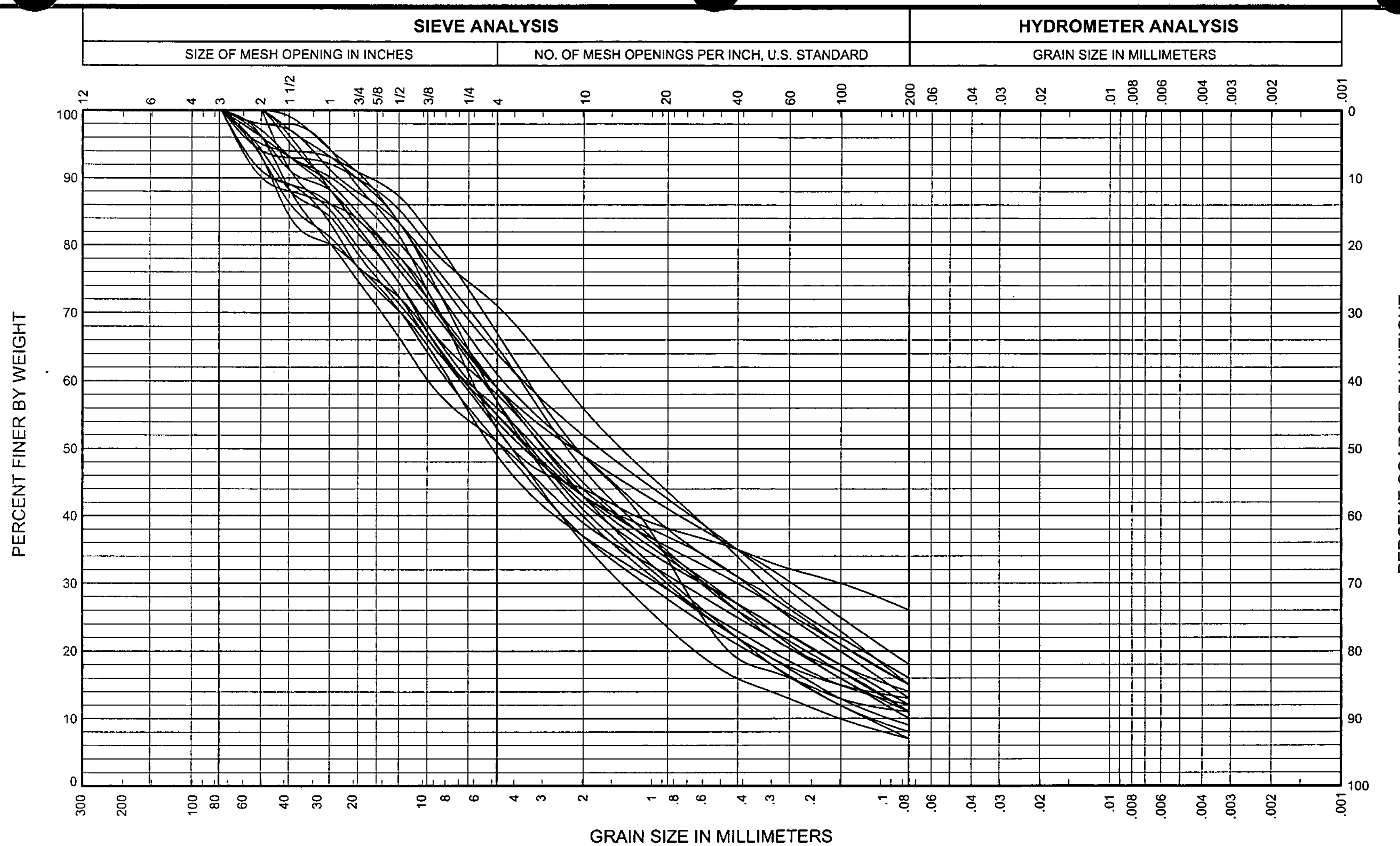

COBBLES	GRAVEL		SAND			FINES: SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

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GRAIN SIZE DISTRIBUTION NDOT MATERIAL SITE ES 04-09

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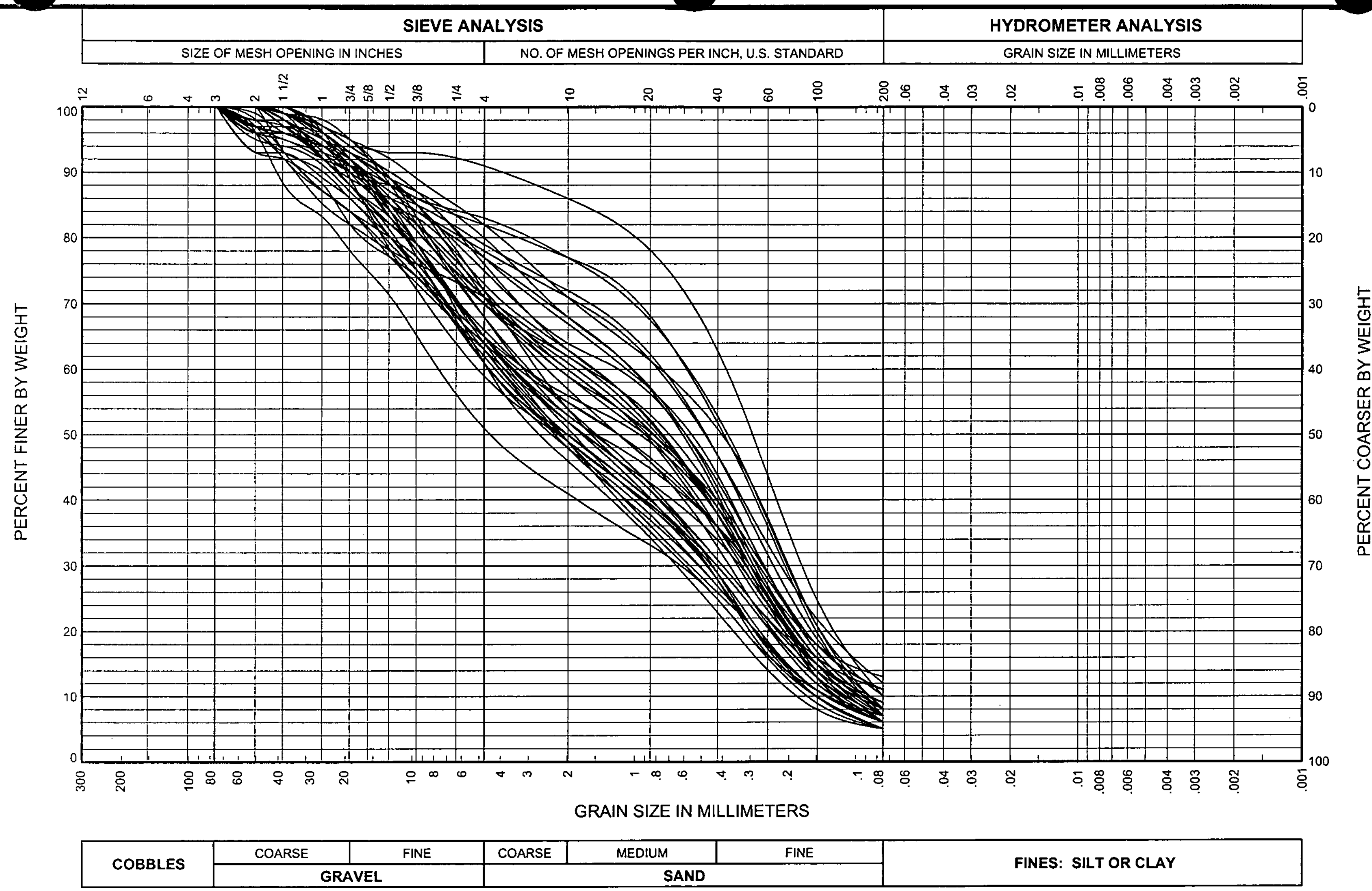
FIG. A-12

FIG. A-12



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GRAIN SIZE DISTRIBUTION
NDOT MATERIAL SITE ES 05-01

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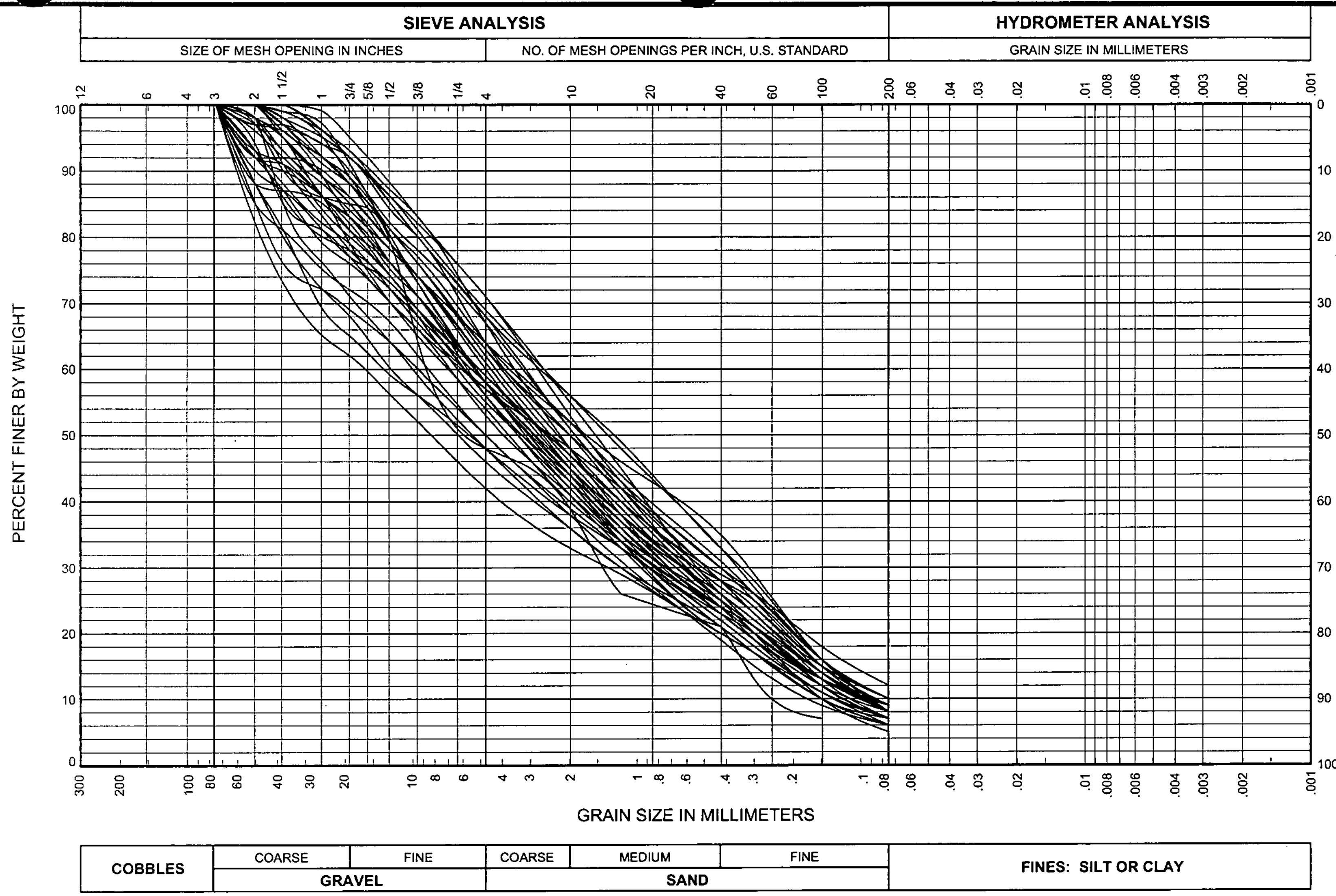
FIG. A-13



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Phase 1a Mina Route

GRAIN SIZE DISTRIBUTION NDOT MATERIAL SITE ES 05-02

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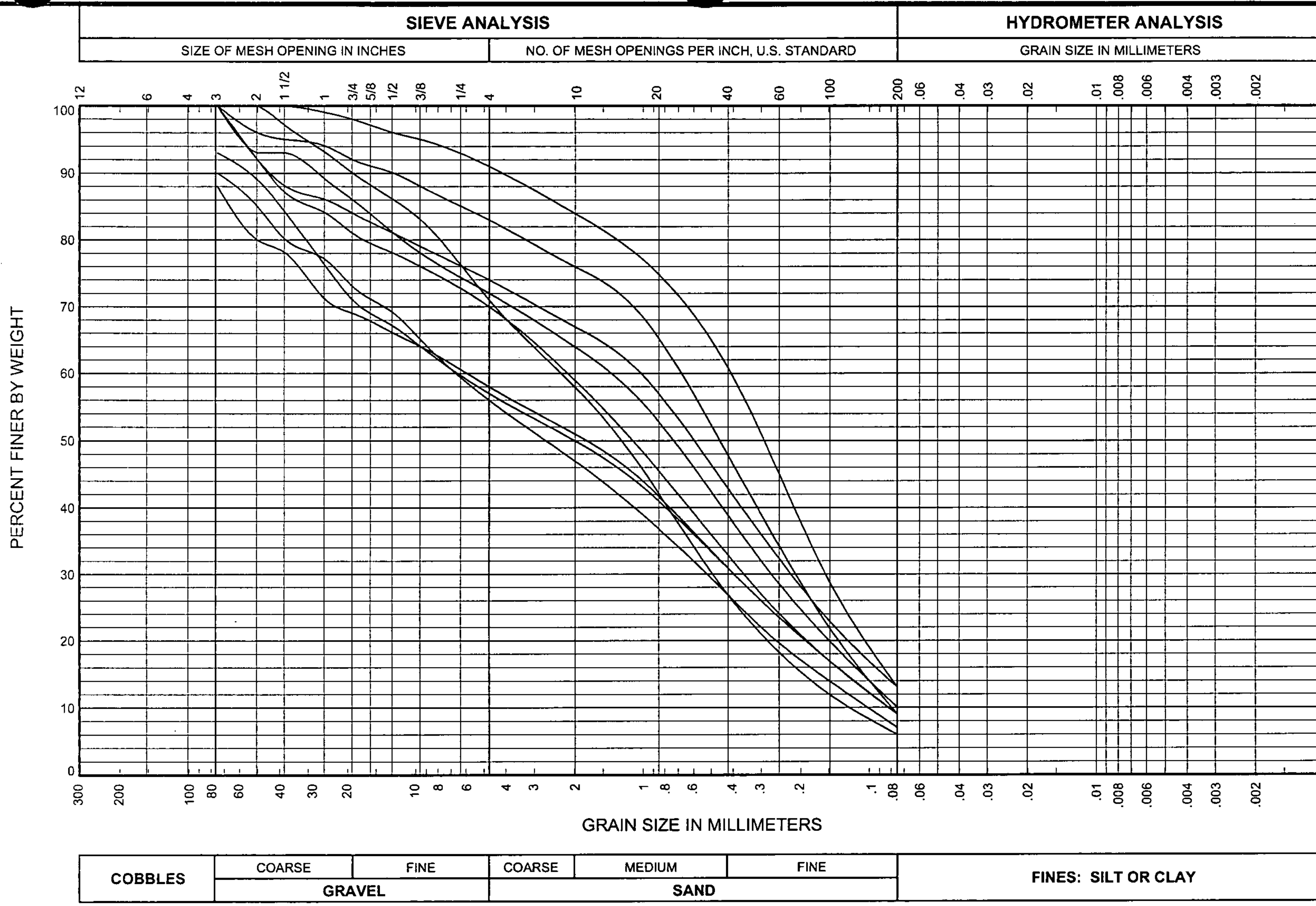
FIG. A-14



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Phase 1a Mina Route

GRAIN SIZE DISTRIBUTION
NDOT MATERIAL SITE MI 01-02

21-1-20102-222

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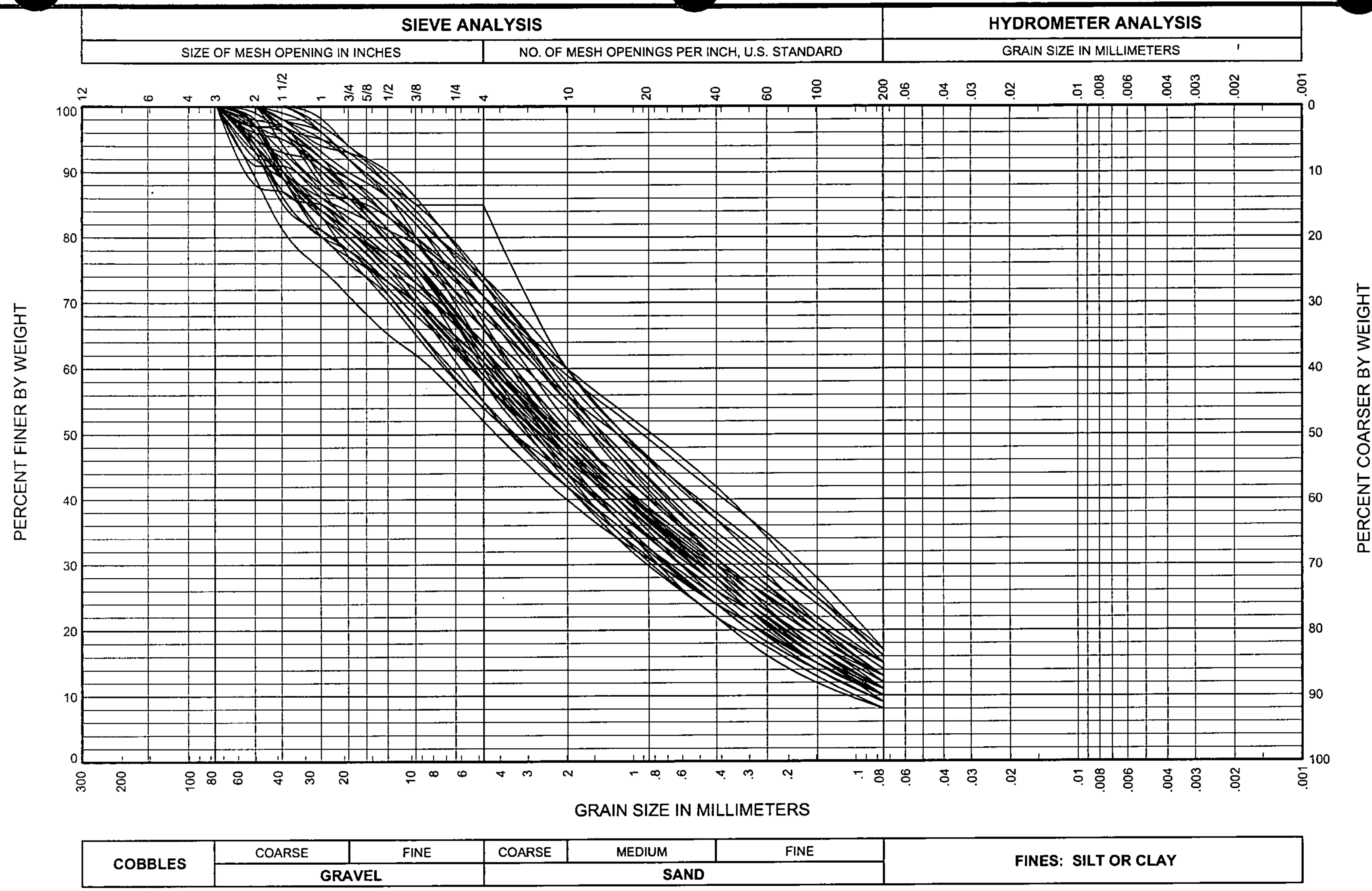
FIG. A-15



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Phase 1a Mina Route

GRAIN SIZE DISTRIBUTION
NDOT MATERIAL SITE MI 01-03

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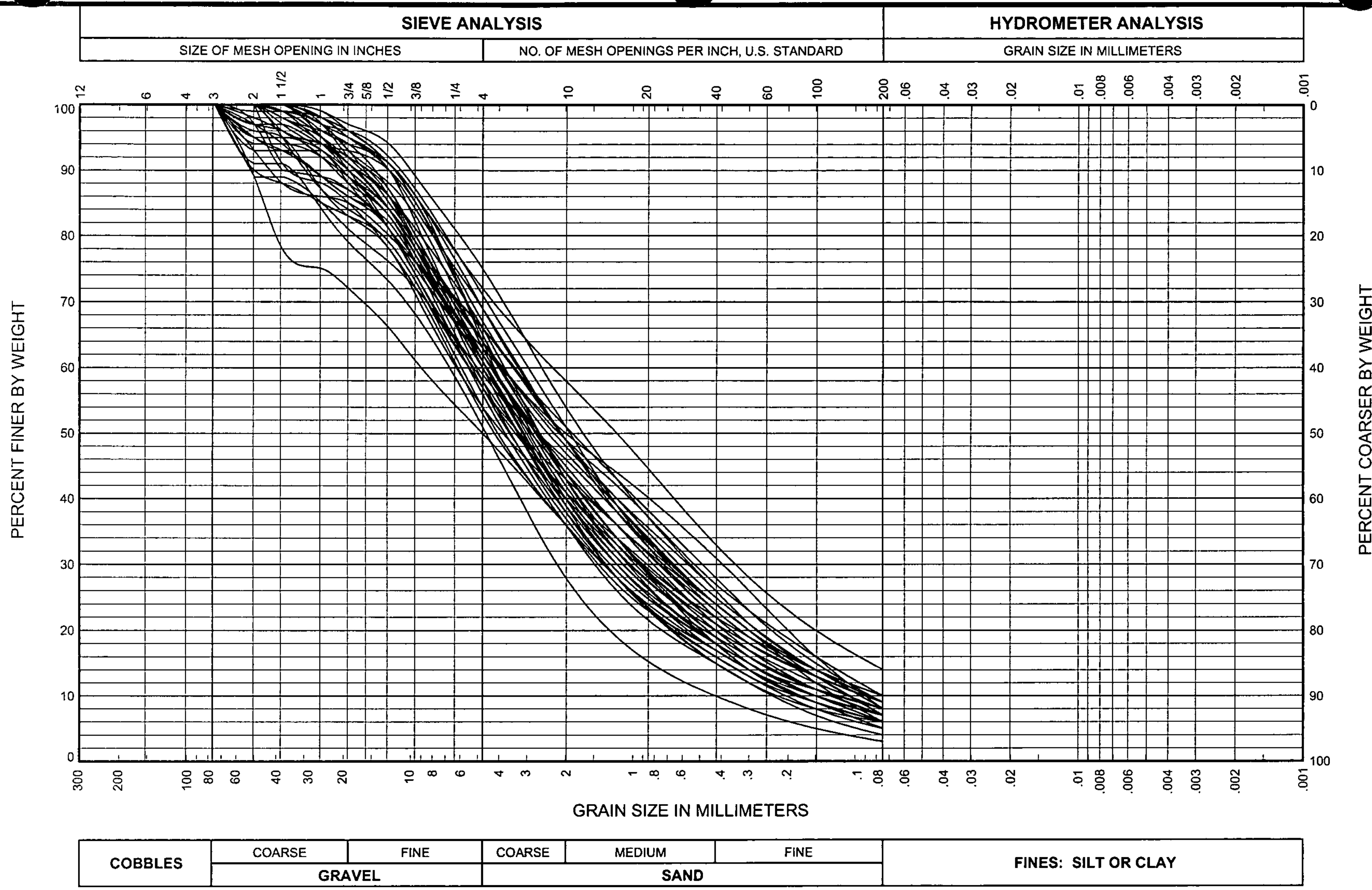
FIG. A-16

21-20102.GPJ SHAN_WIL.GDT Date Printed: 25-Jul-07

FIG. A-16



Yucca Mountain Project
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Phase 1a Mina Route

GRAIN SIZE DISTRIBUTION
NDOT MATERIAL SITE MI 01-04

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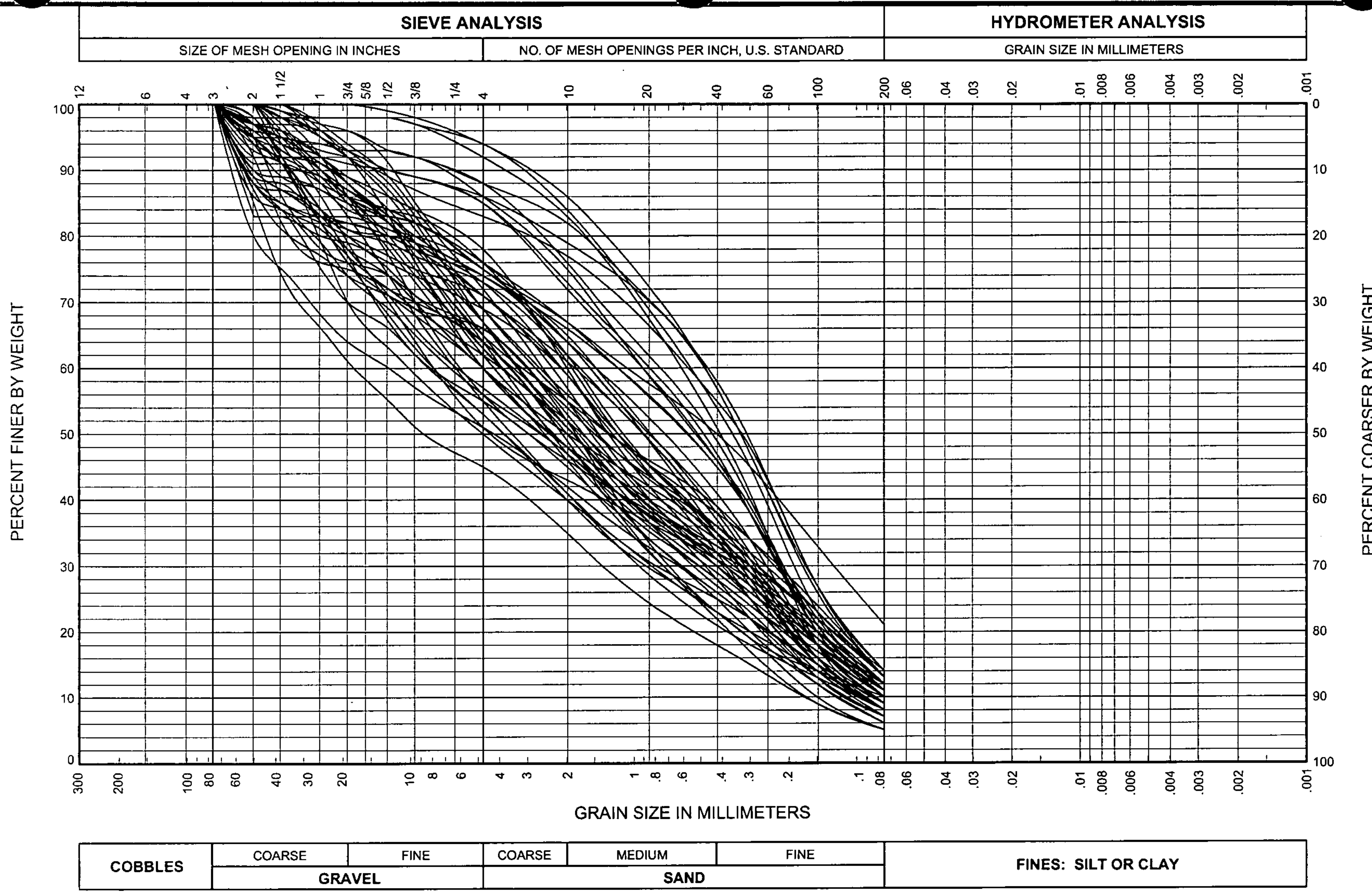
FIG. A-17

GSASUM_MANY 21-20102.GPJ SHAN_WIL.GDT Date Printed: 25-Jul-07



Yucca Mountain Project
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Phase 1a Mina Route

GRAIN SIZE DISTRIBUTION
NDOT MATERIAL SITE MI 01-06A

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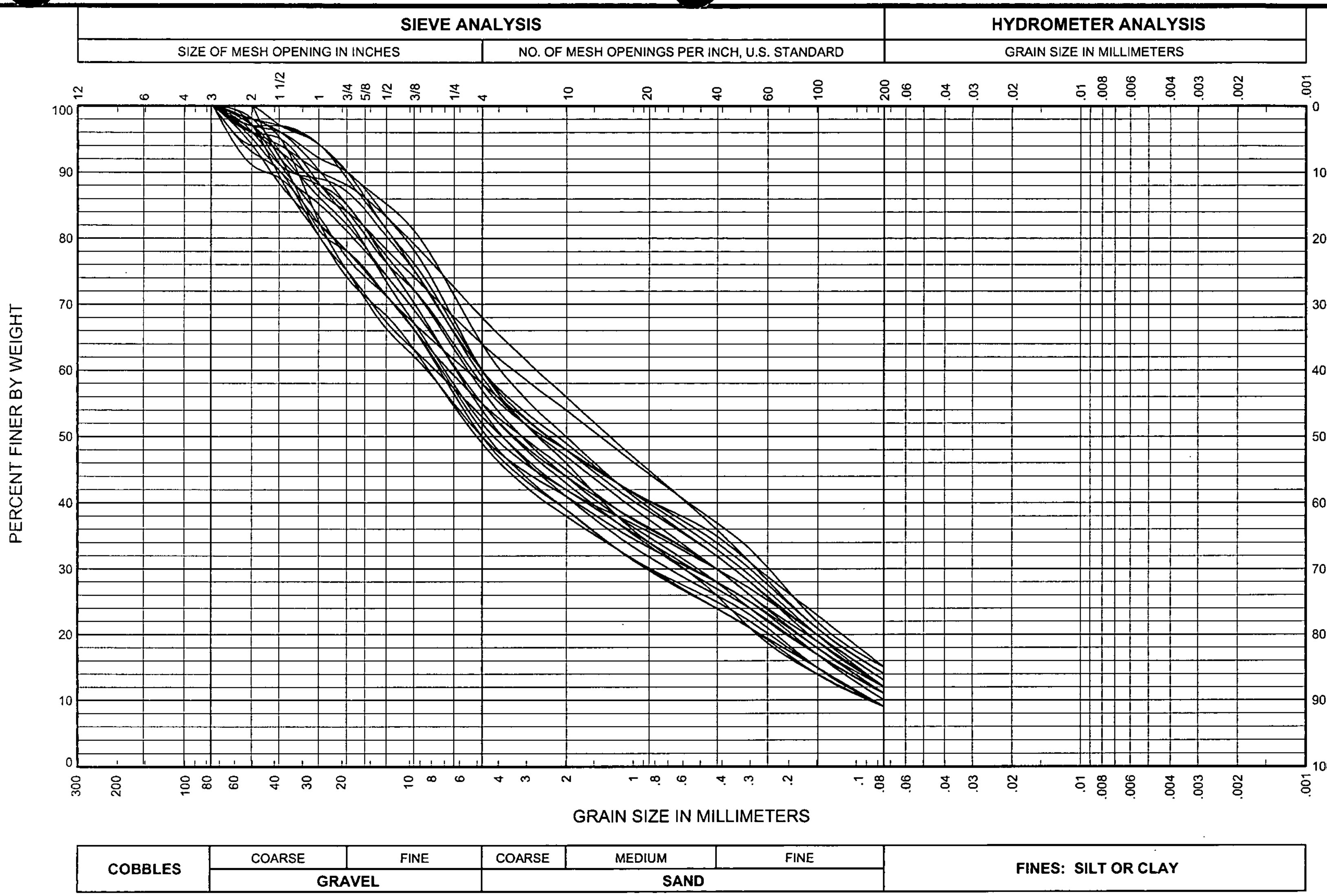
FIG. A-18

21-20102.GPJ SHAN_WIL.GDT Date Printed: 25-Jul-07



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Nevada Rail Corridor
Phase 1a Mina Route

GRAIN SIZE DISTRIBUTION NDOT MATERIAL SITE MI 01-08

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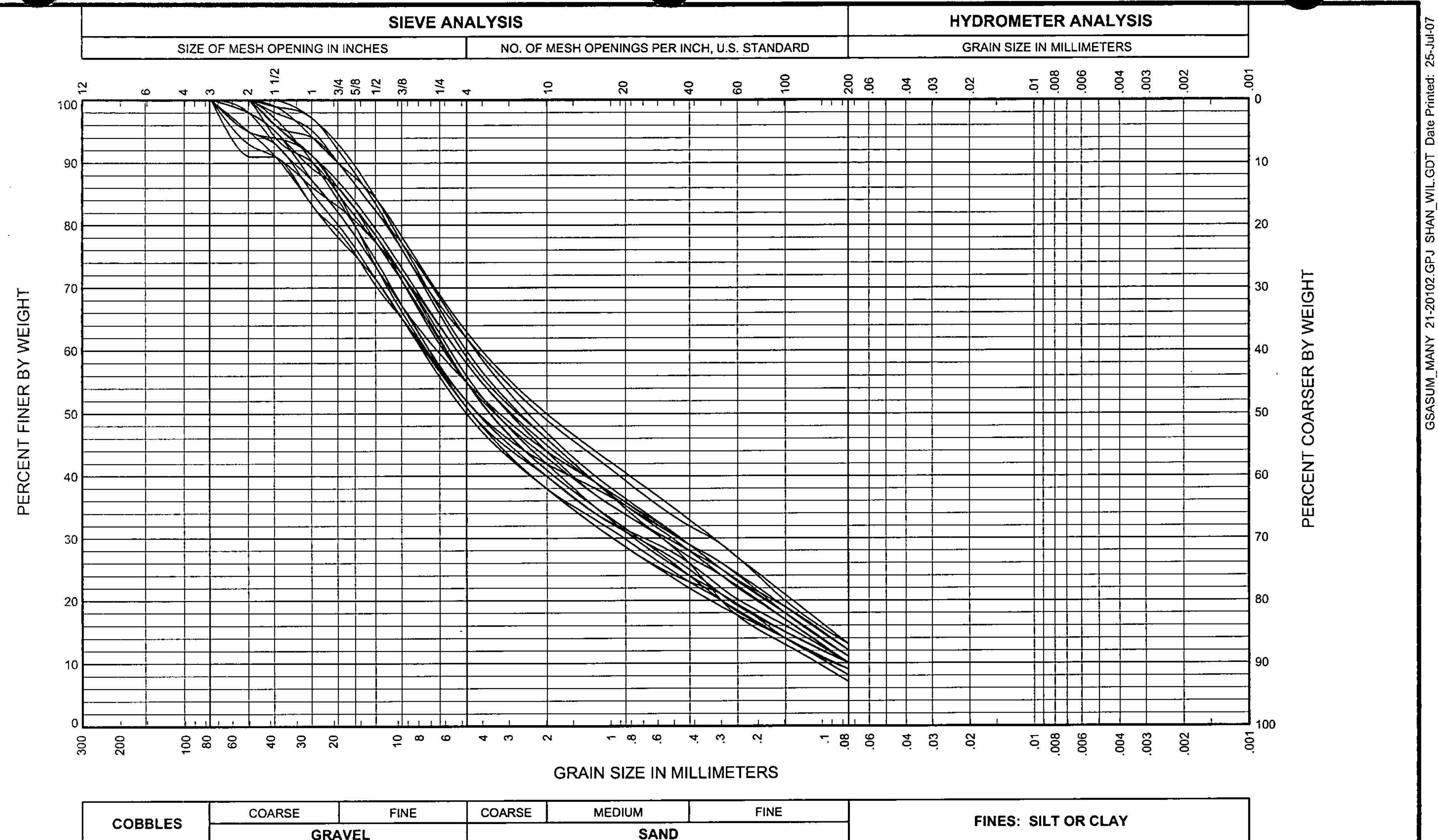
FIG. A-19



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GRAIN SIZE DISTRIBUTION NDOT MATERIAL SITE MI 01-09A

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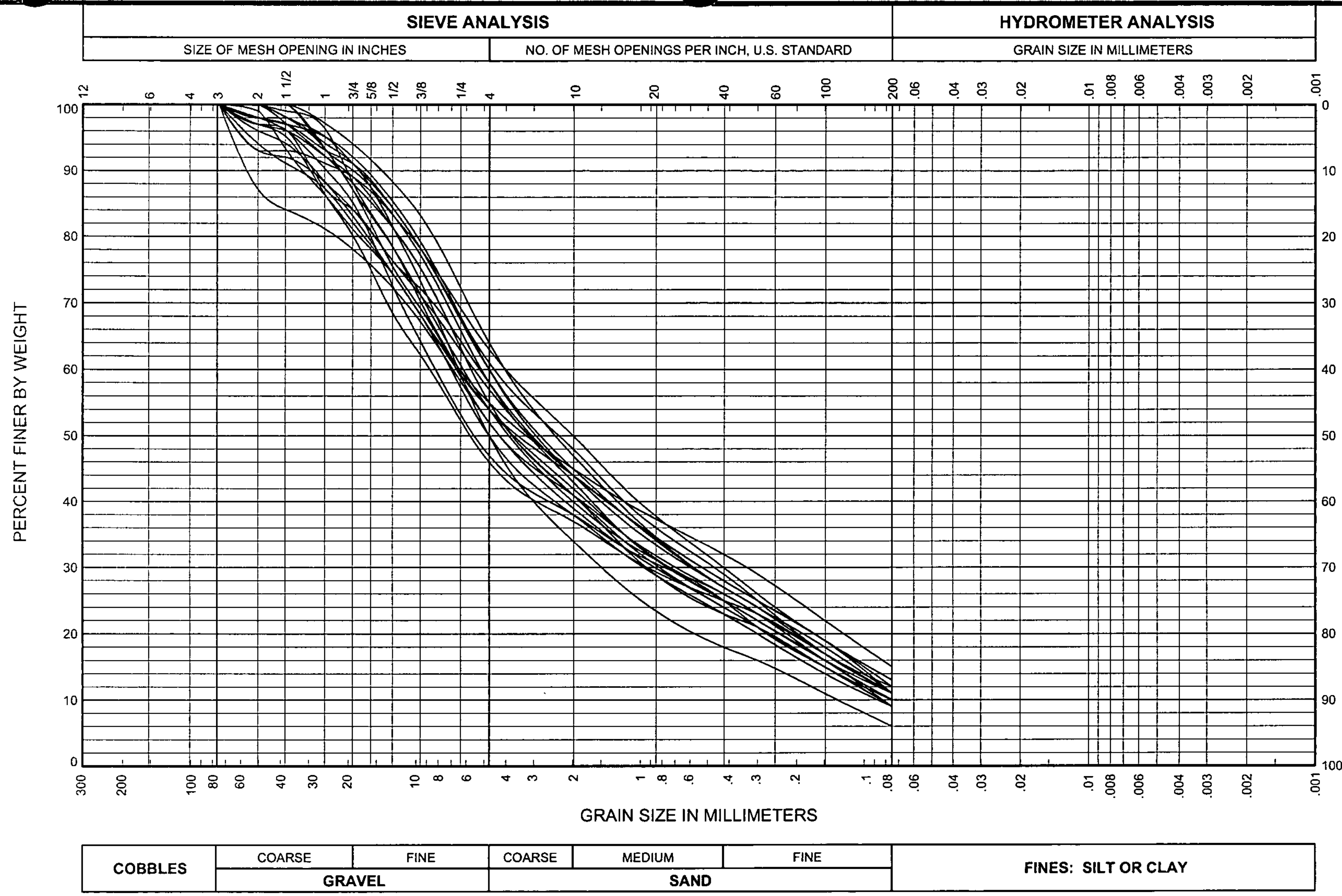
FIG. A-20

FIG. A-20



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Phase 1a Mina Route

GRAIN SIZE DISTRIBUTION NDOT MATERIAL SITE MI 01-09B

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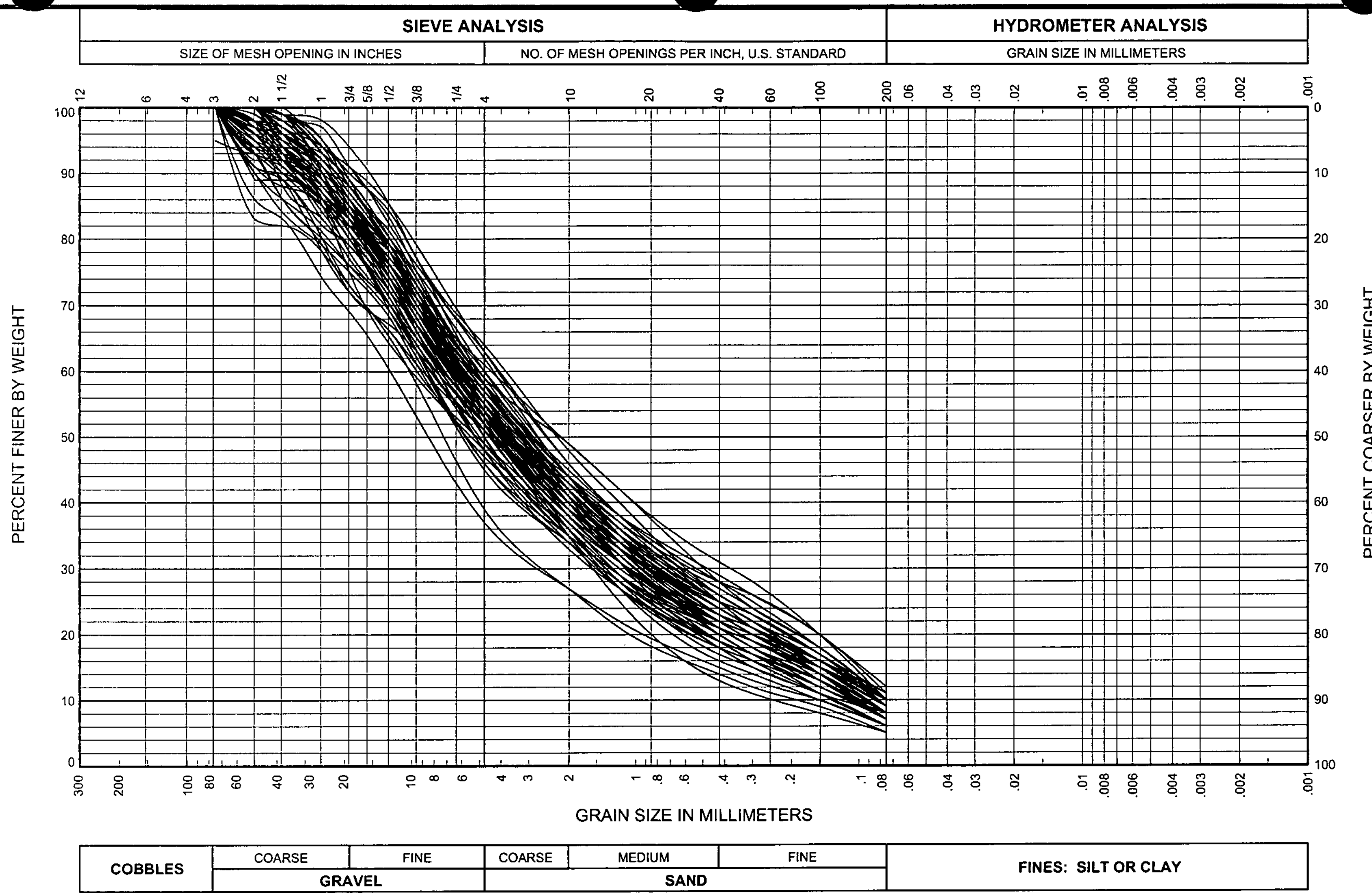
FIG. A-21

FIG. A-21



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Phase 1a Mina Route

GRAIN SIZE DISTRIBUTION NDOT MATERIAL SITE MI 02-03

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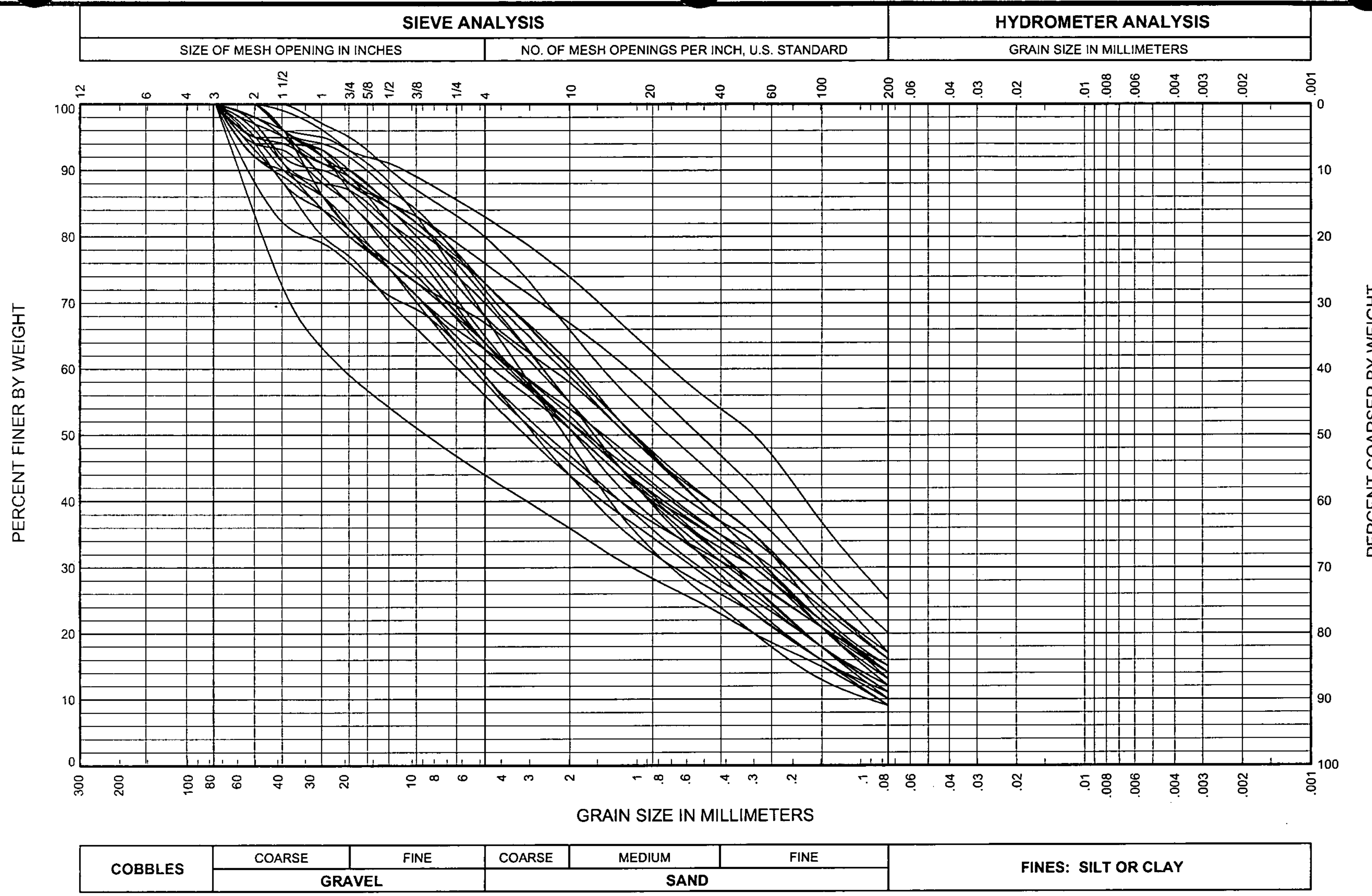
FIG. A-22



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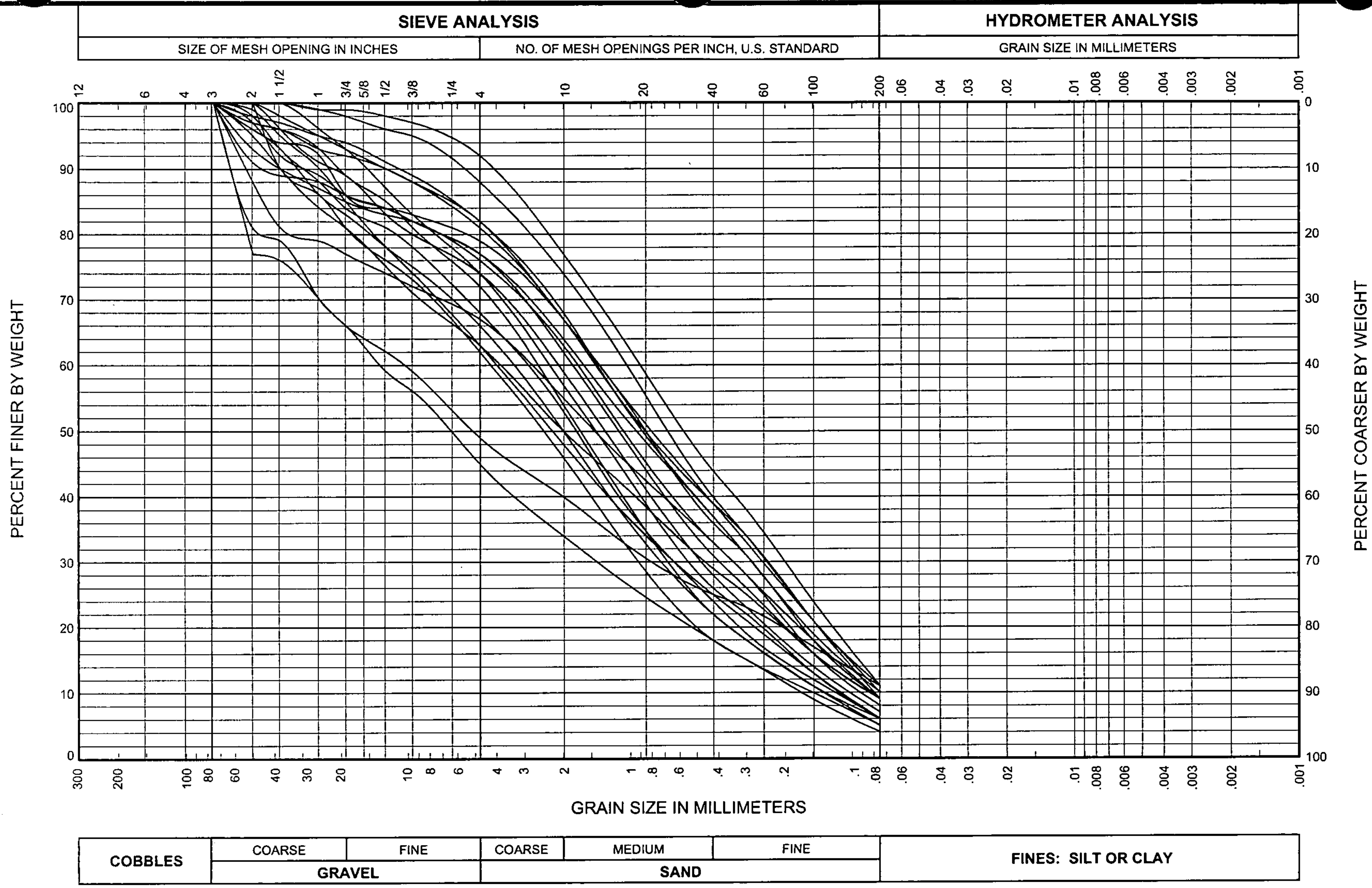
Yucca Mountain Project Nevada Rail Corridor Phase 1a Mina Route
GRAIN SIZE DISTRIBUTION NDOT MATERIAL SITE MI 02-04
21-1-20102-222
SHANNON & WILSON, INC. Geotechnical and Environmental Consultants — **FIG. A-23**

FIG. A-23



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Phase 1a Mina Route

GRAIN SIZE DISTRIBUTION NDOT MATERIAL SITE MI 02-05

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FIG. A-24

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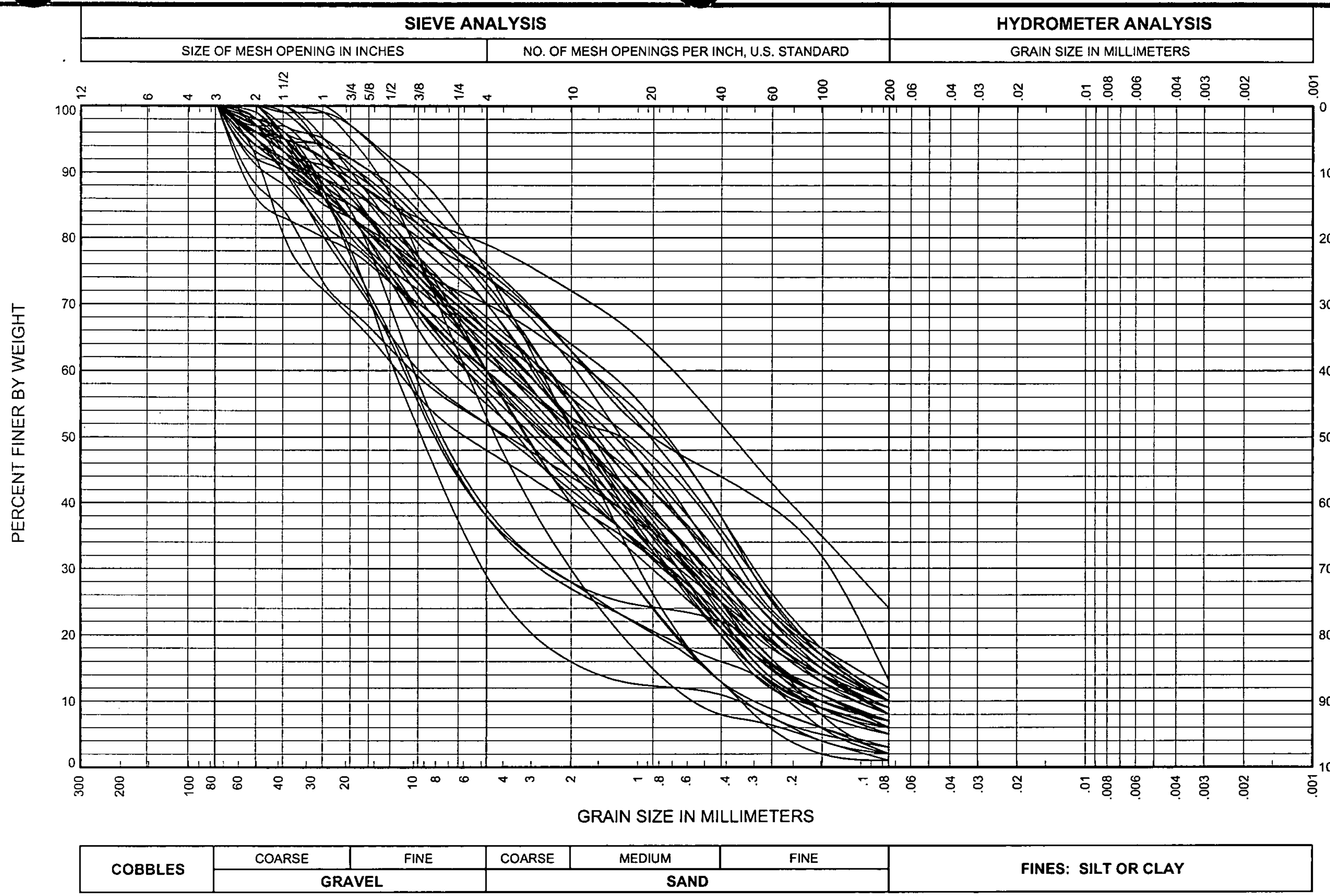
FIG. A-24



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Phase 1a Mina Route

GRAIN SIZE DISTRIBUTION
NDOT MATERIAL SITE MI 04-01

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FIG. A-25

APPENDIX B

SHANNON & WILSON, INC.
FIELD REFERENCES – SOIL AND ROCK CLASSIFICATION

FIELD REFERENCE SOIL CLASSIFICATION

ORDER OF CLASSIFICATION TERMS

Relative density or consistency,

color,

slightly (5 to 12%),

minor constituents (12 to 50%)

MAJOR constituent (>50%),

trace constituents (0 to 5%);

moisture content;

structure, plasticity, gradation, grain shape, min., cementation, organics, odor, other;

(Geologic Name: Fill, Till, Alluvium, etc.)

USCS group symbol.

EXAMPLES

Very dense, light brown, slightly silty, sandy fine GRAVEL, trace of cobbles; moist; scattered roots; (Weathered Till) GP-GM.

Medium stiff, dark gray, silty CLAY, trace of fine sand; moist; laminated (< 2mm) with light gray silt, occasional slickensides; (Glaciolacustrine) CL.

Medium dense, dark brown, sandy SILT, trace of clay; wet; numerous organics and strong organic odor; (Marsh Deposits) ML.

Loose and soft, mottled black and green, silty SAND and clayey SILT; moist; hydrocarbon sheen and faint hydrocarbon odor; (Fill) SM/ML.

STRUCTURE

TERM	THICKNESS
Parting	0 to 1/16"
Seam	1/16 to 1/2"
Layer	> 1/2"
Lamination	< 6 mm, < 1/4"
Pocket	Irregular, < 1 foot
Varved	Alternating seams or lam.
Occasional	< 1 per foot
Frequent	≥ 1 per foot

DESCRIPTION	CRITERIA, LIST THICKNESS
Stratified	Alternating layers
Interbedded	Alternating layers > 1/2"
Laminated	Alt. layers < 6 mm thick
Fractured	Breaks easily along definite fractured planes
Slickensided	Polished, glossy, striated fractured planes
Blocky, Diced	Easily breaks into small angular lumps
Lensed	Small pockets of diff. soils
Homogenous	Same color and appearance throughout
Sheared	Disturbed texture, mix of strengths

ORGANIC CONTENT

ADJECTIVE	PERCENT BY VOLUME
Occasional	0 to 1
Scattered	1 to 10
Numerous	10 to 30
Organic	30 to 50, minor constituent
PEAT	50 to 100, MAJOR const.

Describe type and size of organic debris.

TERM	GRAIN SIZE	EXAMPLES
Boulders	> 12"	> Basketball
Cobbles	3" to 12"	Fist to basketball
Gravel-coarse	3/4" to 3"	Thumb to fist
Gravel-fine	#4 to 3/4"	Pea to thumb
Sand-coarse	#10 to #4 (5 mm)	Rock salt to peat
Sand-medium	#40 to #10 (2 mm)	Sugar to rock salt
Sand-fine	#200 to #40 (0.4 mm)	Flour to sugar
Fines	< #200 (0.08 mm)	Grains not visible

MOISTURE CONTENT

Dry	Dusty, dry to the touch
Moist	Damp but no visible water near optimum
Wet	Visible free water, saturated, over optimum

RELATIVE DENSITY OF COARSE-GRAINED (COHESIONLESS) SOILS
(Cohesionless Silt, Sand, and Gravel)

N. SPT, BLOWS/FT	RELATIVE DENSITY	FIELD TEST FOR RELATIVE DENSITY OF SAND
0 to 4	Very loose	Easily penetrated with 1/2" reinforcing rod pushed by hand
4 to 10	Loose	Easily penetrated with 1/2" reinforcing rod pushed by hand
10 to 30	Medium dense	Penetrated one foot with 1/2" reinforcing rod driven with 5-lb hammer
30 to 50	Dense	Penetrated one foot with 1/2" reinforcing rod driven with 5-lb hammer
Over 50	Very dense	Penetrated only a few inches with 1/2" reinf. rod driven with 5-lb hammer

RELATIVE CONSISTENCY OF FINE-GRAINED (COHESIVE) SOILS
(Cohesive Silt, Clayey Silt, and Clay)

N. SPT, BLOWS/FT	RELATIVE CONSISTENCY	TORVANE, tsf SHEAR STR.	POC. PEN., tsf UNCONF. STR.	MANUAL PENETRATION TEST
< 2	Very soft	< 0.13	< 0.25	Easy several inches by fist
2 to 4	Soft	0.13 to 0.25	0.25 to 0.5	Easy several inches by thumb
4 to 8	Medium stiff	0.25 to 0.5	0.5 to 1	Moderate several inches by thumb
8 to15	Stiff	0.5 to 1	1 to 2	Readily indented by thumb
15 to 30	Very stiff	1 to 2	2 to 4	Readily indented by thumbnail
Over 30	Hard	> 2	> 4	Difficulty by thumbnail

UNIFIED SOIL CLASSIFICATION SYSTEM
(From USACE Tech Memo 3-357)

MAJOR DIVISIONS			GROUP SYMBOL	TYPICAL DESCRIPTION
Coarse-Grained Soils (more than 50% retained on No. 200 sieve) [Use Dual Symbols for 5 to 12% Fines (i.e. GP-GM)]	Gravels (more than 50% of coarse fraction retained on No.4 sieve)	Clean Gravels (less than 5% fines)	GW	Well-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
			GP	Poorly-Graded Gravels, Gravel-Sand Mixtures
		Gravels with Fines (more than 12% fines)	GM	Silty Gravels, Gravel-Sand-Silt Mixtures
			GC	Clayey Gravels, Gravel-Sand-Clay Mixtures
	Sands (50% or more of coarse fraction passes the No. 4 sieve)	Clean Sands (less than 5% fines)	SW	Well-Graded Sands, Gravelly Sands, Little or No Fines
			SP	Poorly-Graded Sands, Gravelly Sands, Little or No Fines
		Sands with Fines (more than 12% fines)	SM	Silty Sands, Sand-Silt Mixtures
			SC	Clayey Sands, Sand-Clay Mixtures
Fine-Grained Soils (50% or more passes the No. 200 sieve)	Silts and Clays (liquid limit less than 50)	Inorganic	ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
			CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
		Organic	OL	Organic Silts and Organic Silty Clays of Low Plasticity
	Silts and Clays (liquid limit 50 or more)	Inorganic	CH	Inorganic Clays of Medium to High Plasticity, Sandy Fat Clay, Gravelly Fat Clay
			MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sands or Silty Soils, Elastic Silt
		Organic	OH	Organic Clays of Medium to High Plasticity, Organic Silts
Highly Organic Soils	Primarily organic matter, dark in color, and organic odor		PT	Peat, Humus, Swamp Soils with High Organic Content (See D 4427-92)

GRADATION	DESCRIPTION	EXAMPLES
Well-graded	Full range and even distribution of grain sizes present	Silty, sandy GRAVEL
Poorly-graded	Narrow range of grain sizes present	Fine to medium SAND, trace of silt
Uniformly -graded	Consists predominantly of one grain size	Fine SAND
Gap-graded	Within the range of grain sizes present, one or more sizes are missing	Silty, medium to coarse SAND

FIELD REFERENCE SOIL CLASSIFICATION

Dual Symbols
(symbols separated by a hyphen, i.e., SP-SM, slightly silty fine SAND) are used for soils with between 5% and 12% fines or when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart.

Borderline Symbols
(symbols separated by a slash, i.e., CL/ML, silty CLAY/clayey SILT; GW/SW, sandy GRAVEL/gravelly SAND) indicate that the soil may fall into one of two possible basic groups.

ASTM D 2488 Tables

TABLE 8 Criteria for Describing Dry Strength

DESCRIPTION	CRITERIA
None	The dry specimen crumbles into powder with mere pressure of handling.
Low	The dry specimen crumbles into powder with some finger pressure.
Medium	The dry specimen breaks into pieces or crumbles with considerable finger pressure.
High	The dry specimen cannot be broken with finger pressure. Specimen will break into pieces between thumb and a hard surface.
Very High	The dry specimen cannot be broken between the thumb and a hard surface.

TABLE 9 Criteria for Describing Dilatancy

DESCRIPTION	CRITERIA
None	No visible change in the specimen.
Slow	Water appears slowly on the surface of the specimen during shaking and does not disappear or disappears slowly upon squeezing
Rapid	Water appears quickly on the surface of the specimen during shaking and disappears quickly upon squeezing.

TABLE 10 Criteria for Describing Toughness

DESCRIPTION	CRITERIA
Low	Only slight pressure is required to roll the thread near the plastic limit. The thread and the lump are weak and soft.
Medium	Medium pressure is required to roll the thread to near the plastic limit. The thread and the lump have medium stiffness.
High	Considerable pressure is required to roll the thread to near the plastic limit. The thread and the lump have very high stiffness.

TABLE 11 Criteria for Describing Plasticity

DESCRIPTION	CRITERIA
Nonplastic	A 1/8-in. (3mm) thread cannot be rolled at any water content.
Low	The thread can barely be rolled and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

TABLE 1 Criteria for Describing Angularity of Coarse-Grained Particles

DESCRIPTION	CRITERIA
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces.
Subangular	Particles are similar to angular description but have rounded edges.
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges.
Rounded	Particles have smoothly curved sides and no edges.

TABLE 2 Criteria for Describing Particle Shape

DESCRIPTION	CRITERIA
	The particle shape shall be described as follows where length, width, and thickness refer to the greatest, intermediate, and least dimensions of a particle, respectively.
Flat	Particles with width/thickness > 3
Elongated	Particles with length/width > 3
Flat and Elongated	Particles meet criteria for both flat and elongated

TABLE 4 Criteria for Describing the Reaction with HCl

DESCRIPTION	CRITERIA
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately

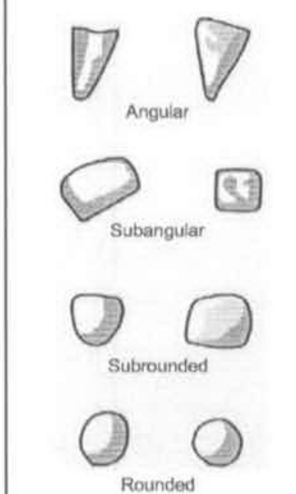
TABLE 6 Criteria for Describing Cementation

DESCRIPTION	CRITERIA
Weak	Crumbles or breaks with handling or little finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

TABLE 12 Identification of Inorganic Fine-Grained Soils from Manual Tests

SOIL SYMBOL	DRY STRENGTH	DILATANCY	TOUGHNESS
ML	None to Low	Slow to Rapid	Low or Thread Cannot be Formed
CL	Medium to High	None to Slow	Medium
MH	Low to Medium	None to Slow	Low to Medium
CH	High to Very High	None	High

GRAIN SHAPE



SPT SPECS (From Dept. of Interior Earth Manual)

140-lb hammer, 30-inch freefall

Cathead: 6 to 10-inch diameter, 2-1/4 rope turns, ≥ 100 rpm, mechanical OK

Sampler: 18 to 30-inch long, shoe ID = 1.375 inches, barrel ID = 1.5 inches, OD = 2.0 inches

Count blows for each of three 6-inch increments
Refusal: 50 blows for 6 inches or less, 10 blows for 0 inches

Standard Penetration Resistance = "N-Value" = blows for last 12 inches

FIELD REFERENCE ROCK CLASSIFICATION

ORDER OF CLASSIFICATION TERMS

1. ROCK NAME:
   (see back of sheet)
2. strength,
3. basic rock description;
4. structure;
5. weathering;
6. other or unique features
7. (Formation or Member name)

EXAMPLE

BASALT: moderate strength, gray, fine grained; moderately vesicular, smooth, closely-spaced, high angle joints with iron-oxide staining; slightly weathered (Wanapum Basalt).

3. BASIC ROCK DESCRIPTION

COLOR

TEXTURE (see back side of sheet)

CEMENTATION: Weakly / Strongly

INDURATION: Slightly / Highly

4. STRUCTURE

a) FABRIC: Bedding, foliation, etc.; Describe type, spacing, orientation

b) VESICULARITY: Describe percent by volume and size of holes (range and typical)

c) DISCONTINUITIES: Describe type, number of sets, spacing or intercept (range and typical), roughness, healing, aperture (width), filling type and consistency (use soil terms), and orientation or dip (low / high or angle)

4a. FABRIC TERMS

Sedimentary Rocks:

MASSIVE - Rock without significant structure

BEDDED - Regular layering from sedimentation

FISSILE - Tendency to break along laminations

Metamorphic Rocks:

FOLIATED - Parallel arrangement or distribution of minerals

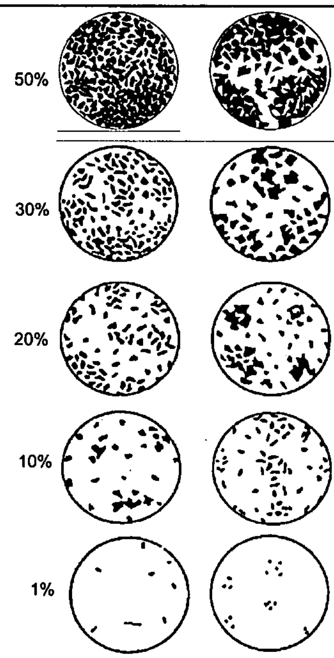
SCHISTOSE - Parallel arrangement of tabular minerals giving a planar fissility

GNEISSOSE - Segregation of minerals into bands

CLEAVAGE - Tendancy to split along secondary, planar textures or structures

4b. VESICULARITY

Slightly Vesicular	1 to 10%
Moderately Vesicular	10 to 30%
Highly Vesicular	30 to 50%
Scoriaceous	>50%



COMPARISON CHART
(percent by volume)

4c. DISCONTINUITY TERMS

FRACTURE - Collective term for any natural break excluding shears, shear zones, and faults

JOINT (JT) - Planar break with little or no displacement

FOLIATION JOINT (FJ) or BEDDING JOINT (BJ) - Joint along foliation or bedding

INCIPIENT JOINT (IJ) or INCIPIENT FRACTURE (IF) - Joint or fracture not evident until wetted and dried; breaks along existing surface

RANDOM FRACTURE (RF) - Natural, very irregular fracture that does not belong to a set

BEDDING PLANE SEPARATION or PARTING - A separation along bedding after extraction from stress relief or slaking

FRACTURE ZONE (FZ) - Planar zone of broken rock without gouge

MECHANICAL BREAK (MB) - Breaks due to drilling or handling; drilling break (DB), hammer break (HB).

SHEAR (SH) - Surface of differential movement evident by presence of slickensides, striations, or polishing

SHEAR ZONE (SZ) - Zone of gouge and rock fragments bounded by planar shear surfaces

FAULT (FT) - Shear zone of significant extent; differentiation from shear may be site-specific

4c. OUTCROP DATA

When collecting outcrop data, fracture orientation, aperture, roughness, and filling type / consistency, should be described in greater detail than is possible with core. Depending on the nature or investigation, additional data should also be recorded:

Fracture WALL STRENGTH

Fracture CONTINUITY OR LENGTH

Fracture ENDS OBSERVED (0, 1, 2)

Fracture MOISTURE CONDITIONS (dry, dry but stained, damp, wet, dripping, flowing)

BLOCK SIZE

When this level of detail is required, a special data collection form should be used.

APPENDIX C

PHOTOGRAPHS FROM FIELD RECONNAISSANCE

(CD)

TABLE C-1
LOG OF PHOTOGRAPHS

PHOTO ID	WAYPT	ROUTE	STATION	OFFSET (FEET)	DIRECTION	COMMENT	SOURCE	DATE
MT1001_ALG_0001_05Oct06.jpg	MT1001	MCS1	1251+07	68839		KJg sheared granodiorite in Wassuk Range	ALG	10/5/2006
MT1001_SMP_0006_05Oct06.jpg	MT1001	MCS1	1251+07	68839	NW	KJg outcrop, sheared zone	SMP	10/5/2006
MT1001_SMP_0007_05Oct06.jpg	MT1001	MCS1	1251+07	68839	N	KJg outcrop closeup	SMP	10/5/2006
MT1001_WTL_0025_05Oct06.jpg	MT1001	MCS1	1251+07	68839		Granodiorite of Alum Cr. in Cottonwood Canyon	WTL	10/5/2006
MT1001_WTL_0026_05Oct06.jpg	MT1001	MCS1	1251+07	68839		Granodiorite of Alum Cr. in Cottonwood Canyon	WTL	10/5/2006
MT1001_WTL_0027_05Oct06.jpg	MT1001	MCS1	1251+07	68839		Closeup of KJg granodiorite	WTL	10/5/2006
MT1002_ALG_0002_05Oct06.jpg	MT1002	MCS1	1244+01	71113		KJg granite & granodiorite in Wassuk Range	ALG	10/5/2006
MT1002_ALG_0003_05Oct06.jpg	MT1002	MCS1	1244+01	71113		KJg weathered granite in Wassuk Range	ALG	10/5/2006
MT1002_SMP_0008_05Oct06.jpg	MT1002	MCS1	1244+01	71113	W	KJg outcrop; less sheared, degraded zone	SMP	10/5/2006
MT1002_SMP_0009_05Oct06.jpg	MT1002	MCS1	1244+01	71113	NW	closeup of sheared/altered KJg	SMP	10/5/2006
MT1002_WTL_0028_05Oct06.jpg	MT1002	MCS1	1244+01	71113		Granite outcrop	WTL	10/5/2006
MT1002_WTL_0029_05Oct06.jpg	MT1002	MCS1	1244+01	71113		Color difference between sheared granodiorite and granite	WTL	10/5/2006
MT1002_WTL_0030_05Oct06.jpg	MT1002	MCS1	1244+01	71113		Closeup of granite outcrop	WTL	10/5/2006
MT1002_WTL_0031_05Oct06.jpg	MT1002	MCS1	1244+01	71113		Hillside of granite; note chute without outcrop	WTL	10/5/2006
MT1004_ALG_0006_05Oct06.jpg	MT1004	MCS1	NA	NA		Ql fg-mg sand	ALG	10/5/2006
MT1004_ALG_0007_05Oct06.jpg	MT1004	MCS1	NA	NA		Ql silty sand & sandy silt	ALG	10/5/2006
MT1004_WTL_0035_05Oct06.jpg	MT1004	MCS1	NA	NA		Test hole with silty fine sand and fine sandy silt	WTL	10/5/2006
MT1007_ALG_0013_05Oct06.jpg	MT1007	MCS1	1156+75	-166		Silty sand and sand	ALG	10/5/2006
MT1007_SMP_0013_05Oct06.jpg	MT1007	MCS1	1156+75	-166	S	Qay alluvial fan outcrop	SMP	10/5/2006
MT1007_WTL_0037_05Oct06.jpg	MT1007	MCS1	1156+75	-166		Cut bank with silty fine to coarse sand underlain by fine sandy silt	WTL	10/5/2006
MT1007_WTL_0038_05Oct06.jpg	MT1007	MCS1	1156+75	-166		Closeup of cut bank (061005037)	WTL	10/5/2006
MT1008_ALG_0014_05Oct06.jpg	MT1008	MCS1	1270+24	-543		Qe sediments	ALG	10/5/2006
MT1008_WTL_0040_05Oct06.jpg	MT1008	MCS1	1270+24	-543		Test hole with slightly silty fine sand	WTL	10/5/2006
MT1008_WTL_0041_05Oct06.jpg	MT1008	MCS1	1270+24	-543		Test hole with slightly silty fine sand	WTL	10/5/2006
MT1009_ALG_0019_05Oct06.jpg	MT1009	MCS1	1369+02	-169		Gillis Range fan alluvium	ALG	10/5/2006
MT1009_ALG_0020_05Oct06.jpg	MT1009	MCS1	1369+02	-169		Gillis Range fan alluvium	ALG	10/5/2006
MT1009_ALG_0021_05Oct06.jpg	MT1009	MCS1	1369+02	-169		Gillis Range fan alluvium	ALG	10/5/2006
MT1009_WTL_0045_05Oct06.jpg	MT1009	MCS1	1369+02	-169		Old trench exposure	WTL	10/5/2006
MT1009_WTL_0046_05Oct06.jpg	MT1009	MCS1	1369+02	-169		Old trench exposure	WTL	10/5/2006
MT1010_ALG_0022_05Oct06.jpg	MT1010	MCS1	1469+83	1357		Latite of Ta4 in Garfield Hills	ALG	10/5/2006
MT1010_ALG_0023_05Oct06.jpg	MT1010	MCS1	1469+83	1357		Latite of Ta4 in Garfield Hills	ALG	10/5/2006
MT1010_SMP_0014_05Oct06.jpg	MT1010	MCS1	1469+83	1357	E	Ta3 cut slope, approx. 35 degrees	SMP	10/5/2006
MT1010_SMP_0015_05Oct06.jpg	MT1010	MCS1	1469+83	1357	SSE	Ta3 cut slope, approx. 35 degrees	SMP	10/5/2006
MT1010_WTL_0047_05Oct06.jpg	MT1010	MCS1	1469+83	1357		Latite outcrop in US 95 road cut	WTL	10/5/2006
MT1010_WTL_0048_05Oct06.jpg	MT1010	MCS1	1469+83	1357		Latite outcrop in US 95 road cut; 35 degree slope	WTL	10/5/2006
MT1010_WTL_0049_05Oct06.jpg	MT1010	MCS1	1469+83	1357		Latite outcrop in US 95 road cut	WTL	10/5/2006
MT1010_WTL_0050_05Oct06.jpg	MT1010	MCS1	1469+83	1357		Latite outcrop in US 95 road cut	WTL	10/5/2006
MT1011_ALG_0024_05Oct06.jpg	MT1011	MCS1	1565+77	97		Ta4 latite overlying TRPvs sheared rhyolite	ALG	10/5/2006
MT1011_SMP_0016_05Oct06.jpg	MT1011	MCS1	1565+77	97	SE	Ta3/TrPvs cut slope, approx. 51 degrees	SMP	10/5/2006
MT1011_SMP_0017_05Oct06.jpg	MT1011	MCS1	1565+77	97	SSE	Ta3/TrPvs cut slope, approx. 51 degrees	SMP	10/5/2006
MT1011_WTL_0051_05Oct06.jpg	MT1011	MCS1	1565+77	97		Tertiary latite overlying Triassic rhyolite in US 95 road cu	WTL	10/5/2006
MT1011_WTL_0052_05Oct06.jpg	MT1011	MCS1	1565+77	97		Tertiary latite overlying Triassic rhyolite in US 95 road cu	WTL	10/5/2006
MT1011_WTL_0053_05Oct06.jpg	MT1011	MCS1	1565+77	97		Old RR N of US 95	WTL	10/5/2006
MT1011_WTL_0054_05Oct06.jpg	MT1011	MCS1	1565+77	97		Contact of latite and rhyolite in US 95 road cut; note paleosol	WTL	10/5/2006
MT1012_WTL_0055_05Oct06.jpg	MT1012	MCS1	1610+60	1536		NDOT Pit MI 02-05; 8 to 10 feet deep	WTL	10/5/2006
MT1013_ALG_0025_05Oct06.jpg	MT1013	MCS1	1399+49	7988		Tb in Garfield Hills	ALG	10/5/2006
MT1013_ALG_0026_05Oct06.jpg	MT1013	MCS1	1399+49	7988		Tb in Garfield Hills	ALG	10/5/2006
MT1013_SMP_0019_05Oct06.jpg	MT1013	MCS1	1399+49	7988	E	Tb outcrop	SMP	10/5/2006
MT1013_WTL_0056_05Oct06.jpg	MT1013	MCS1	1399+49	7988		Tertiary basalt outcrop, S of US 95	WTL	10/5/2006
MT1013_WTL_0057_05Oct06.jpg	MT1013	MCS1	1399+49	7988		Tertiary basalt outcrop, S of US 95	WTL	10/5/2006

TABLE C-1
LOG OF PHOTOGRAPHS

PHOTO ID	WAYPT	ROUTE	STATION	OFFSET (FEET)	DIRECTION	COMMENT	SOURCE	DATE
MT1013_WTL_0058_05Oct06.jpg	MT1013	MCS1	1399+49	7988		Tertiary basalt outcrop, S of US 95; closeup	WTL	10/5/2006
MT1013_WTL_0059_05Oct06.jpg	MT1013	MCS1	1399+49	7988		Larger outcrop of Tertiary basalt S of N outcrop (300 feet long x 50 feet high	WTL	10/5/2006
MT1017_ALG_0031_06Oct06.jpg	MT1017	S6	NA	NA		Qbf sandy silt in Campbell Valley	ALG	10/6/2006
MT1018_ALG_0036_06Oct06.jpg	MT1018	S4	10106+66	23		Tsy above wash & QTf in wash	ALG	10/6/2006
MT1018_ALG_0037_06Oct06.jpg	MT1018	S4	10106+66	23		QTf crossbedded sand	ALG	10/6/2006
MT1018_ALG_0038_06Oct06.jpg	MT1018	S4	10106+66	23		Tsy thinly bedded clay, silt, and fg sand	ALG	10/6/2006
MT1021_ALG_0044_06Oct06.jpg	MT1021	S2	10466+35	-780		Butte of basaltic andesite in Ta4	ALG	10/6/2006
MT1021_ALG_0045_06Oct06.jpg	MT1021	S2	10466+35	-780		Basaltic andesite shear zone	ALG	10/6/2006
MT1021_ALG_0046_06Oct06.jpg	MT1021	S2	10466+35	-780		Basaltic andesite boulders capping butte	ALG	10/6/2006
MT1021_SMP_0031_06Oct06.jpg	MT1021	S2	10466+35	-780	NNW	andesite shear zone	SMP	10/6/2006
MT1021_SMP_0032_06Oct06.jpg	MT1021	S2	10466+35	-780	NNW	zoom-out from andesite shear zone	SMP	10/6/2006
MT1021_SMP_0033_06Oct06.jpg	MT1021	S2	10466+35	-780	NNE	view of blocky andesite, Ta2	SMP	10/6/2006
MT1024B_ALG_0057_07Oct06.jpg	MT1024B	S2	10675+16	-437		Qc sand and gravelly sand	ALG	10/7/2006
MT1024B_ALG_0058_07Oct06.jpg	MT1024B	S2	10675+16	-437		Fluvial sl. silty, mg sand	ALG	10/7/2006
MT1026_ALG_0064_07Oct06.jpg	MT1026	S3	10000+18	5074		Weber Dam quarry in KJg quartz monzonite	ALG	10/7/2006
MT1026_ALG_0065_07Oct06.jpg	MT1026	S3	10000+18	5074		KJg quartz monzonite in Weber Dam quarry	ALG	10/7/2006
MT1026_ALG_0066_07Oct06.jpg	MT1026	S3	10000+18	5074		Fracture sets in KJg quartz monzonite	ALG	10/7/2006
MT1026_ALG_0067_07Oct06.jpg	MT1026	S3	10000+18	5074		Fracture sets in KJg quartz monzonite quarry	ALG	10/7/2006
MT1026_SMP_0039_07Oct06.jpg	MT1026	S3	10000+18	5074	E	White Mtn. quarry	SMP	10/7/2006
MT1026_SMP_0040_07Oct06.jpg	MT1026	S3	10000+18	5074	SE	White Mtn. quarry	SMP	10/7/2006
MT1027_ALG_0071_07Oct06.jpg	MT1027	S3	10033+80	315		Qao fan alluvium on east side of Reservation Hill	ALG	10/7/2006
MT1027A_SMP_0043_07Oct06.jpg	MT1027A	S3	10037+89	22	E	test hole showing surficial soils: medium dense, reddish brown, slightly gravelly, slightly silty to silty SAND; SW-SM/SM	SMP	10/7/2006
MT1028_ALG_0075_07Oct06.jpg	MT1028	S3	10071+74	67		Lake & fluvial sediments by Walker R	ALG	10/7/2006
MT1028_ALG_0076_07Oct06.jpg	MT1028	S3	10071+74	67	SE	View SE of fluvial sediments by Walker River	ALG	10/7/2006
MT1028_SMP_0050_07Oct06.jpg	MT1028	S3	10071+74	67	SE	sand & gravel outcrop on SW side of Walker River Valley crossing, east of waypoint on river bank	SMP	10/7/2006
MT1028_WTL_0343_16Nov06.jpg	MT1028	S3	10071+74	67		Eroded west bluff at Walker R crossing	WTL	11/16/2006
MT1028_WTL_0344_16Nov06.jpg	MT1028	S3	10071+74	67		Eroded west bluff at Walker R crossing	WTL	11/16/2006
MT1028_WTL_0345_16Nov06.jpg	MT1028	S3	10071+74	67		Eroded west bluff at Walker R crossing	WTL	11/16/2006
MT1028_WTL_0346_16Nov06.jpg	MT1028	S3	10071+74	67		Badlands south of Walker R crossing	WTL	11/16/2006
MT1028_WTL_0347_16Nov06.jpg	MT1028	S3	10071+74	67		Badlands south of Walker R crossing	WTL	11/16/2006
MT1030_ALG_0080_07Oct06.jpg	MT1030	S2	10733+22	63	N	View N of wash cut into QTg fan along S1 & 2	ALG	10/7/2006
MT1034_ALG_0087_08Oct06.jpg	MT1034	S2	11072+53	-102		Eolian sand over sandy silt in Qbf	ALG	10/8/2006
MT1035A_ALG_0091_08Oct06.jpg	MT1035A	S1	11066+28	-658		Qay alluvium on Calico Hills fan	ALG	10/8/2006
MT1035A_SMP_0061_08Oct06.jpg	MT1035A	S1	11066+28	-658	NNE	test pit approx. 10 feet deep in Qay	SMP	10/8/2006
MT1036A_ALG_0096_08Oct06.jpg	MT1036A	S3	10478+15	-858		Qay fan alluvium from Calico Hills	ALG	10/8/2006
MT1036A_ALG_0097_08Oct06.jpg	MT1036A	S3	10478+15	-858	N	View N of borrow pit in fan alluvium	ALG	10/8/2006
MT1036A_SMP_0062_08Oct06.jpg	MT1036A	S3	10478+15	-858	N	overview of gravel pit	SMP	10/8/2006
MT1036A_SMP_0063_08Oct06.jpg	MT1036A	S3	10478+15	-858	N	boulder or bedrock exposure?	SMP	10/8/2006
MT1036A_SMP_0064_08Oct06.jpg	MT1036A	S3	10478+15	-858	N	boulder in borrow pit	SMP	10/8/2006
MT1037_ALG_0100_08Oct06.jpg	MT1037	S2	11151+78	80		Qe overlying indurated sand and silt in Qbf	ALG	10/8/2006
MT1037_SMP_0065_08Oct06.jpg	MT1037	S2	11151+78	80	N	test hole showing surficial soils: approx. 4 inches of loose, brown SAND, trace of silt (SP), overlying dense to very dense, gray-brown to brown, slightly fine sandy SILT, trace of medium to coarse sand (ML)	SMP	10/8/2006
MT1041_ALG_0114_08Oct06.jpg	MT1041	S3	10622+26	35	NW	View NW of Qe on SZ1	ALG	10/8/2006
MT1041_SMP_0070_08Oct06.jpg	MT1041	S3	10622+26	35	SW	cut through Qe, approx. 20-21 degree slope	SMP	10/8/2006
MT1041_WTL_0337_16Nov06.jpg	MT1041	S3	10622+26	35		Road cut in dune sand (Qe) at Schurz	WTL	11/16/2006
MT1041_WTL_0338_16Nov06.jpg	MT1041	S3	10622+26	35		Road cut in dune sand (Qe) at Schurz	WTL	11/16/2006
MT1042A_ALG_0118_08Oct06.jpg	MT1042A	S2	11196+13	898		Qbf variably indurated, clayey sand and silt	ALG	10/8/2006

TABLE C-1
LOG OF PHOTOGRAPHS

PHOTO ID	WAYPT	ROUTE	STATION	OFFSET (FEET)	DIRECTION	COMMENT	SOURCE	DATE
MT1046_ALG_0142_09Oct06.jpg	MT1046	S3	10968+81	235		Qay fan alluvium	ALG	10/9/2006
MT1046_ALG_0143_09Oct06.jpg	MT1046	S3	10968+81	235		Qay fan alluvium sloping toward tracks	ALG	10/9/2006
MT1046A_SMP_0085_09Oct06.jpg	MT1046A	S3	10971+69	19	NE	RR embankment overview	SMP	10/9/2006
MT1046A_SMP_0088_09Oct06.jpg	MT1046A	S3	10971+69	19	E	cut slope overview	SMP	10/9/2006
MT1046A_SMP_0090_09Oct06.jpg	MT1046A	S3	10971+69	19	SE	gravel outcrop in cut	SMP	10/9/2006
MT1047_ALG_0129_09Oct06.jpg	MT1047	S6	12357+94	-19882		KJg quartz monzonite in Gillis Range	ALG	10/9/2006
MT1047_ALG_0130_09Oct06.jpg	MT1047	S6	12357+94	-19882		KJg quartz monzonite cut by a rhyolite dike	ALG	10/9/2006
MT1047_ALG_0131_09Oct06.jpg	MT1047	S6	12357+94	-19882		KJg quartz monzonite	ALG	10/9/2006
MT1047_ALG_0133_09Oct06.jpg	MT1047	S6	12357+94	-19882		KJg quartz monzonite	ALG	10/9/2006
MT1047_ALG_0134_09Oct06.jpg	MT1047	S6	12357+94	-19882		KJg quartz monzonite	ALG	10/9/2006
MT1047_SMP_0076_09Oct06.jpg	MT1047	S6	12357+94	-19882	NE	Granite outcrop	SMP	10/9/2006
MT1047_SMP_0078_09Oct06.jpg	MT1047	S6	12357+94	-19882	N	Granite outcrop showing J1, J2, J3 in SMP's notes	SMP	10/9/2006
MT1047_SMP_0079_09Oct06.jpg	MT1047	S6	12357+94	-19882	W	wedge failure	SMP	10/9/2006
MT1047_SMP_0080_09Oct06.jpg	MT1047	S6	12357+94	-19882	S	SMP's J4 (shear zone)	SMP	10/9/2006
MT1051_ALG_0153_09Oct06.jpg	MT1051	MCS1	1794+22	941		Borrow pit in Garfield Hills Qao fan	ALG	10/9/2006
MT1052_ALG_0156_09Oct06.jpg	MT1052	MCS1	1876+50	-219		Borrow pit excavated in Qao fan alluvium	ALG	10/9/2006
MT1053_ALG_0157_09Oct06.jpg	MT1053	MCS1	1971+11	2377	E	View E down Garfield Hills Qao fan	ALG	10/9/2006
MT1054_ALG_0160_10Oct06.jpg	MT1054	MCS1	2202+02	-233		Qao fan alluvium exposed in a trench	ALG	10/10/2006
MT1054_SMP_0094_09Oct06.jpg	MT1054	MCS1	2202+02	-233	W	trench wall exposure	SMP	10/9/2006
MT1054_SMP_0095_09Oct06.jpg	MT1054	MCS1	2202+02	-233	W	closeup of exposed trench wall	SMP	10/9/2006
MT1055_ALG_0161_10Oct06.jpg	MT1055	MCS1	2222+16	-10669		Qao in Gillis Range fan cropped	ALG	10/10/2006
MT1055_ALG_0162_10Oct06.jpg	MT1055	MCS1	2222+16	-10669		Qao in Gillis Range fan	ALG	10/10/2006
MT1055_ALG_0163_10Oct06.jpg	MT1055	MCS1	2222+16	-10669		Preferential burrowing in a loose sand interval	ALG	10/10/2006
MT1055_ALG_0164_10Oct06.jpg	MT1055	MCS1	2222+16	-10669	NE	PAN NE OF GILLIS RANGE QAO FAN	ALG	10/10/2006
MT1055_SMP_0097_10Oct06.jpg	MT1055	MCS1	2222+16	-10669	E	Qao outcrop	SMP	10/10/2006
MT1055_SMP_0098_10Oct06.jpg	MT1055	MCS1	2222+16	-10669	E	closeup of Qao outcrop	SMP	10/10/2006
MT1055_SMP_0099_10Oct06.jpg	MT1055	MCS1	2222+16	-10669	E	very dense vs. loose Qao exposure showing the different weathering rates	SMP	10/10/2006
MT1055_SMP_0100_10Oct06.jpg	MT1055	MCS1	2222+16	-10669	W	Qao outcrop	SMP	10/10/2006
MT1055_SMP_0101_10Oct06.jpg	MT1055	MCS1	2222+16	-10669	N	gravel pit overview	SMP	10/10/2006
MT1057_ALG_0166_10Oct06.jpg	MT1057	MCS1	2206+83	-22809		KJg granite outcrops	ALG	10/10/2006
MT1057_ALG_0167_10Oct06.jpg	MT1057	MCS1	2206+83	-22809		Altered Oligocene Mickey Pass Tuff and Jurassic diorite, Todd Mountain	ALG	10/10/2006
MT1057_ALG_0168_10Oct06.jpg	MT1057	MCS1	2206+83	-22809		Alteration in possible fault zone at granite-diorite contac	ALG	10/10/2006
MT1057_ALG_0169_10Oct06.jpg	MT1057	MCS1	2206+83	-22809		Typical weathering of KJg granite	ALG	10/10/2006
MT1057_ALG_0170_10Oct06.jpg	MT1057	MCS1	2206+83	-22809		Typical rectangular fractures in granite	ALG	10/10/2006
MT1057_ALG_0171_10Oct06.jpg	MT1057	MCS1	2206+83	-22809		Weathered granite in contact with diorite	ALG	10/10/2006
MT1057_ALG_0172_10Oct06.jpg	MT1057	MCS1	2206+83	-22809		Weathered granite slope	ALG	10/10/2006
MT1057_SMP_0102_10Oct06.jpg	MT1057	MCS1	2206+83	-22809	N	Granite outcrop showing J1, J2, J3 in SMP's notes	SMP	10/10/2006
MT1057_SMP_0103_10Oct06.jpg	MT1057	MCS1	2206+83	-22809	N	Closeup of granite outcrop showing J1, J2, J3 in SMP's notes	SMP	10/10/2006
MT1058_ALG_0175_10Oct06.jpg	MT1058	MCS1	2225+63	-17556		Jurassic diorite & KJg at Todd Mt	ALG	10/10/2006
MT1059_ALG_0176_10Oct06.jpg	MT1059	MCS1	2300+29	-7144		Cretaceous quartz monzonite pluton, Todd Mountain, SW of the New Santa Fe mine	ALG	10/10/2006
MT1059_ALG_0177_10Oct06.jpg	MT1059	MCS1	2300+29	-7144		Coarse detritus at head of GV Range fan	ALG	10/10/2006
MT1061_ALG_0183_10Oct06.jpg	MT1061	MCS1	2372+41	51		Qao sandy gravel in borrow pit	ALG	10/10/2006
MT1061_SMP_0105_10Oct06.jpg	MT1061	MCS1	2372+41	51	S	test hole in Qao	SMP	10/10/2006
MT1062_ALG_0186_10Oct06.jpg	MT1062	MCS1	2416+67	-104		Pleistocene sandy gravel underlying Gabbs Valley Range alluvial fan near the mine shaft	ALG	10/10/2006
MT1062_SMP_0106_10Oct06.jpg	MT1062	MCS1	2416+67	-104	SW	test hole in Qao	SMP	10/10/2006
MT1065_ALG_0190_11Oct06.jpg	MT1065	MCS1	2392+85	-7141		Outcrop of limestone, dolomitic limestone, and shaly dolomite in the Luning Formation	ALG	10/11/2006
MT1065_ALG_0191_11Oct06.jpg	MT1065	MCS1	2392+85	-7141	S	SW-dipping Luning Fm Ls & dolomite	ALG	10/11/2006
MT1065_SMP_0109_11Oct06.jpg	MT1065	MCS1	2392+85	-7141	SW	limestone outcrop	SMP	10/11/2006

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PHOTO ID	WAYPT	ROUTE	STATION	OFFSET (FEET)	DIRECTION	COMMENT	SOURCE	DATE
MT1066_ALG_0196_11Oct06.jpg	MT1066	MCS1	2463+10	144		Qao in Gabbs Valley Range fan	ALG	10/11/2006
MT1066_SMP_0111_11Oct06.jpg	MT1066	MCS1	2463+10	144	SE	test hole in Qao	SMP	10/11/2006
MT1067_ALG_0199_11Oct06.jpg	MT1067	MCS1	2634+19	10		Eolian silty sand and sandy silt	ALG	10/11/2006
MT1067_SMP_0114_11Oct06.jpg	MT1067	MCS1	2634+19	10	NNE	test hole in Qbf, distal fan alluvium	SMP	10/11/2006
MT1068_ALG_0201_11Oct06.jpg	MT1068	MCS1	2624+76	-10258		Interlayered Ta3 lahars and thin andesite flows	ALG	10/11/2006
MT1068_ALG_0202_11Oct06.jpg	MT1068	MCS1	2624+76	-10258		Thin Ta3 andesite flow overlying a lahar	ALG	10/11/2006
MT1068_ALG_0203_11Oct06.jpg	MT1068	MCS1	2624+76	-10258		Thin Ta3 andesite flow in Volcano Canyon	ALG	10/11/2006
MT1068_ALG_0204_11Oct06.jpg	MT1068	MCS1	2624+76	-10258		Thick Ta3 lahar in Volcano Canyon	ALG	10/11/2006
MT1068_SMP_0118_11Oct06.jpg	MT1068	MCS1	2624+76	-10258	NE	andesite outcrop	SMP	10/11/2006
MT1068A_ALG_0200_11Oct06.jpg	MT1068A	MCS1	2626+95	-10832		View down Volcano Canyon in Gabbs Valley Range	ALG	10/11/2006
MT1068A_SMP_0117_11Oct06.jpg	MT1068A	MCS1	2626+95	-10832	NE	Mudflow breccia in two forms	SMP	10/11/2006
MT1070_ALG_0210_11Oct06.jpg	MT1070	MCS1	2924+97	41		Qao & possibly Qbf sandy gravel and fg sand	ALG	10/11/2006
MT1070_SMP_0121_11Oct06.jpg	MT1070	MCS1	2924+97	41	NE	outcrop showing Qao overlying Qbf	SMP	10/11/2006
MT1071_ALG_0215_12Oct06.jpg	MT1071	MCS1	2998+03	118		Qao fan alluvium	ALG	10/12/2006
MT1071_SMP_0122_12Oct06.jpg	MT1071	MCS1	2998+03	118	N	test hole in Qao	SMP	10/12/2006
MT1072_ALG_0217_12Oct06.jpg	MT1072	MCS1	3064+70	-1710	SSW	View SSW of 10-ft deep wash that crosses MCS1	ALG	10/12/2006
MT1074A_ALG_0220_12Oct06.jpg	MT1074A	MCS1	3103+83	-1550		Qao sandy gravel excavated in a trench	ALG	10/12/2006
MT1074A_ALG_0221_12Oct06.jpg	MT1074A	MCS1	3103+83	-1550		Qao sandy gravel	ALG	10/12/2006
MT1074A_SMP_0126_12Oct06.jpg	MT1074A	MCS1	3103+83	-1550	NW	Qao in old test trench	SMP	10/12/2006
MT1074A_SMP_0127_12Oct06.jpg	MT1074A	MCS1	3103+83	-1550	SW	view of old test trench	SMP	10/12/2006
MT1074B_ALG_0227_12Oct06.jpg	MT1074B	MCS1	3117+35	3		Pan up wide, deep wash crossing MCS1	ALG	10/12/2006
MT1074B_ALG_0229_12Oct06.jpg	MT1074B	MCS1	3117+35	3		Qao fan alluvium in N bank of wash	ALG	10/12/2006
MT1074B_ALG_0230_12Oct06.jpg	MT1074B	MCS1	3117+35	3		Qao sandy gravel exposed by wash	ALG	10/12/2006
MT1076_ALG_0235_12Oct06.jpg	MT1076	MCS1	3444+08	-271		Alluvium of composite fan from Pilot Mts & Monte Cristo Range	ALG	10/12/2006
MT1076_SMP_0133_12Oct06.jpg	MT1076	MCS1	3444+08	-271	NE	Qay outcrop, lower layers exposed	SMP	10/12/2006
MT1076_SMP_0134_12Oct06.jpg	MT1076	MCS1	3444+08	-271	NE	Qay outcrop, upper layers exposed	SMP	10/12/2006
MT1078_ALG_0242_12Oct06.jpg	MT1078	MCS1	3449+25	35337		Gilbert Andesite (Ta4) in Candelaria Hills	ALG	10/12/2006
MT1078_ALG_0243_12Oct06.jpg	MT1078	MCS1	3449+25	35337		Columnar jointed andesite flow	ALG	10/12/2006
MT1078_ALG_0244_12Oct06.jpg	MT1078	MCS1	3449+25	35337		Andesite flow over dacite ash-flow tuff	ALG	10/12/2006
MT1078_ALG_0245_12Oct06.jpg	MT1078	MCS1	3449+25	35337		Weathered, fractured ash-flow tuff	ALG	10/12/2006
MT1078_ALG_0246_12Oct06.jpg	MT1078	MCS1	3449+25	35337		Columnar jointed andesite flow	ALG	10/12/2006
MT1078_ALG_0247_12Oct06.jpg	MT1078	MCS1	3449+25	35337		Columnar jointed andesite flow	ALG	10/12/2006
MT1078_SMP_0135_12Oct06.jpg	MT1078	MCS1	3449+25	35337	S	andesite outcrop, source of strike & dip measurements in SMP's notes	SMP	10/12/2006
MT1078_SMP_0136_12Oct06.jpg	MT1078	MCS1	3449+25	35337	E	andesite outcrop, source of strike & dip measurements in SMP's notes	SMP	10/12/2006
MT1078_SMP_0137_12Oct06.jpg	MT1078	MCS1	3449+25	35337	N	andesite with weathered, welded tuff above and below	SMP	10/12/2006
MT1079_ALG_0248_13Oct06.jpg	MT1079	MCS1	3502+49	-89		QTf weakly to well-indurated, silty sand & gravel and sandy silt	ALG	10/13/2006
MT1079_ALG_0249_13Oct06.jpg	MT1079	MCS1	3502+49	-89		Gullied QTf sand & gravel beds	ALG	10/13/2006
MT1079_ALG_0250_13Oct06.jpg	MT1079	MCS1	3502+49	-89		QTf weakly to moderately indurated silty sand, sand, & gravel	ALG	10/13/2006
MT1079_SMP_0142_13Oct06.jpg	MT1079	MCS1	3502+49	-89	N	closeup of dipping Tsy beds	SMP	10/13/2006
MT1081_ALG_0256_13Oct06.jpg	MT1081	MCS1	3584+66	-352		Colluvium-covered sandy siltstone in Tsy	ALG	10/13/2006
MT1081_SMP_0147_13Oct06.jpg	MT1081	MCS1	3584+66	-352	S	test hole showing 8 inches of colluvium overlying SILTSTONE	SMP	10/13/2006
MT1082_SMP_0148_13Oct06.jpg	MT1082	MCS1	3632+66	-194	NW	along alignment MCS1, test hole with siltstone exposed	SMP	10/13/2006
MT1082_SMP_0149_13Oct06.jpg	MT1082	MCS1	3632+66	-194	NW	test hole showing 6 inches of sandy SILT over SILTSTONE	SMP	10/13/2006
MT1082A_SMP_0150_13Oct06.jpg	MT1082A	MCS1	3636+79	877	SW	old RR cut, approx. 20-23 degree slope	SMP	10/13/2006
MT1082B_ALG_0259_13Oct06.jpg	MT1082B	MCS1	3636+48	1005		Qao at distal end of composite Pilot Mts-Monte Cristo Range fan	ALG	10/13/2006
MT1082B_ALG_0260_13Oct06.jpg	MT1082B	MCS1	3636+48	1005		Qao silty sand and calcrete	ALG	10/13/2006
MT1082B_SMP_0151_13Oct06.jpg	MT1082B	MCS1	3636+48	1005	SW	US95 cut; approx. 29-32 degree slope	SMP	10/13/2006
MT1082B_SMP_0152_13Oct06.jpg	MT1082B	MCS1	3636+48	1005	NW	incised cut slope view	SMP	10/13/2006
MT1083_ALG_0262_13Oct06.jpg	MT1083	MCS1	3739+40	91		Qao fan alluvium	ALG	10/13/2006

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MT1083_ALG_0263_13Oct06.jpg	MT1083	MCS1	3739+40	91		View west of nonwelded ash-flow tuff adjacent to the Mina rail corridor in the Redlich claim bloc	ALG	10/13/2006
MT1083_ALG_0264_13Oct06.jpg	MT1083	MCS1	3739+40	91		NW ash-flow tuff in Tsv	ALG	10/13/2006
MT1083_SMP_0155_13Oct06.jpg	MT1083	MCS1	3739+40	91	E	test hole in Qao	SMP	10/13/2006
MT1084_ALG_0267_13Oct06.jpg	MT1084	MCS1	3923+90	30		Qe overlying Qao	ALG	10/13/2006
MT1084_SMP_0157_13Oct06.jpg	MT1084	MCS1	3923+90	30	N	test hole in Qe overlying Qao	SMP	10/13/2006
MT1085_ALG_0274_13Oct06.jpg	MT1085	MCS1	4154+63	7		Qe overlying Qao	ALG	10/13/2006
MT1085_SMP_0158_13Oct06.jpg	MT1085	MCS1	4154+63	7	N	test hole showing Qe overlying CALCRETE, overlying Qao	SMP	10/13/2006
MT1086_ALG_0278_13Oct06.jpg	MT1086	MCS1	4357+16	247		Qe overlying Qao	ALG	10/13/2006
MT1086_SMP_0159_13Oct06.jpg	MT1086	MCS1	4357+16	247	N	along alignment; test hole in Qao	SMP	10/13/2006
MT1088_SMP_0162_14Oct06.jpg	MT1088	MCS1	4693+93	-214	SW	test hole in Qe overlying Qao	SMP	10/14/2006
MT1089_ALG_0293_14Oct06.jpg	MT1089	MCS1	4618+01	-14		Tsv in foreground with Qb in distance	ALG	10/14/2006
MT1089_SMP_0166_14Oct06.jpg	MT1089	MCS1	4618+01	-14	SE	Tsv outcrop & colluvium	SMP	10/14/2006
MT1090_ALG_0294_14Oct06.jpg	MT1090	MCS1	4519+87	539		Esmeralda Fm (Tsv) fluvial sedimentary rocks	ALG	10/14/2006
MT1090_ALG_0295_14Oct06.jpg	MT1090	MCS1	4519+87	539	NW	View NW of Tsv outcrop	ALG	10/14/2006
MT1090_ALG_0296_14Oct06.jpg	MT1090	MCS1	4519+87	539	N	View N of Tsv tuff & sedimentary rocks	ALG	10/14/2006
MT1090_ALG_0297_14Oct06.jpg	MT1090	MCS1	4519+87	539	SE	View SE of Tsv at US-95	ALG	10/14/2006
MT1090_ALG_0298_14Oct06.jpg	MT1090	MCS1	4519+87	539	S	View S of Tsv boulder conglomerate	ALG	10/14/2006
MT1090_ALG_0299_14Oct06.jpg	MT1090	MCS1	4519+87	539	SE	View SE of Tsv on both sides of US-95	ALG	10/14/2006
MT1090_ALG_0300_14Oct06.jpg	MT1090	MCS1	4519+87	539		Tsv fractured boulder conglomerate	ALG	10/14/2006
MT1090_ALG_0301_14Oct06.jpg	MT1090	MCS1	4519+87	539		Conglomerate layers separated by laminated ss, siltstone, & claystone	ALG	10/14/2006
MT1090_ALG_0303_14Oct06.jpg	MT1090	MCS1	4519+87	539		Laminated ss, siltstone & claystone overlying conglomerate	ALG	10/14/2006
MT1090_ALG_0304_14Oct06.jpg	MT1090	MCS1	4519+87	539		Interbedded conglomerate, ss, siltstone, & claystone	ALG	10/14/2006
MT1090_SMP_0178_14Oct06.jpg	MT1090	MCS1	4519+87	539	NW	Esmeralda Formation view	SMP	10/14/2006
MT1090_WTL_0307_15Nov06.jpg	MT1090	MCS1	4519+87	539		North-dipping tuff breccia, conglomerate at Coaldale	WTL	11/15/2006
MT1090_WTL_0308_15Nov06.jpg	MT1090	MCS1	4519+87	539		Closeup of tuff breccia,conglomerate at Coaldale	WTL	11/15/2006
MT1090_WTL_0309_15Nov06.jpg	MT1090	MCS1	4519+87	539		Higher elevation stratified tuff deposits at Coaldale	WTL	11/15/2006
MT1090_WTL_0310_15Nov06.jpg	MT1090	MCS1	4519+87	539	NW	Coaldale cut hill, looking NW	WTL	11/15/2006
MT1090A_ALG_0305_14Oct06.jpg	MT1090A	MCS1	4530+39	824		Platy fracturing ash-flow tuff in Tsv	ALG	10/14/2006
MT1090A_SMP_0167_14Oct06.jpg	MT1090A	MCS1	4530+39	824	NW	cut through Esmeralda Fm., approx. 30-45 degrees; TUFF: gray, high strength, fissille (sheet joints due to weathering)	SMP	10/14/2006
MT1090A_SMP_0168_14Oct06.jpg	MT1090A	MCS1	4530+39	824	SW	cut through Esmeralda Fm., approx. 25-30 degrees; TUFF: gray, high strength, fissille (sheet joints due to weathering)	SMP	10/14/2006
MT1090A_SMP_0169_14Oct06.jpg	MT1090A	MCS1	4530+39	824	NW	cut through Esmeralda Fm., approx. 35-40 degrees; SILTSTONE: moderate strength, gray-brown	SMP	10/14/2006
MT1090A_SMP_0170_14Oct06.jpg	MT1090A	MCS1	4530+39	824	SW	cut through Esmeralda Fm., approx. 23-32 degrees; SILTSTONE: moderate strength, gray-brown	SMP	10/14/2006
MT1090A_SMP_0171_14Oct06.jpg	MT1090A	MCS1	4530+39	824	NW	cut through Esmeralda Fm., approx. 32-80 degrees; CONGLOMERATE: low to moderate strength, reddish brown	SMP	10/14/2006
MT1090A_SMP_0172_14Oct06.jpg	MT1090A	MCS1	4530+39	824	SW	cut through Esmeralda Fm., approx. 32-40 degrees; CONGLOMERATE: low to moderate strength, reddish brown	SMP	10/14/2006
MT1090A_SMP_0173_14Oct06.jpg	MT1090A	MCS1	4530+39	824	NW	cut through Esmeralda Fm., approx. 32-85 degrees; SANDSTONE: low to moderate strength, light brown	SMP	10/14/2006
MT1090A_SMP_0174_14Oct06.jpg	MT1090A	MCS1	4530+39	824	SW	cut through Esmeralda Fm., approx. 32-52 degrees; SANDSTONE: low to moderate strength, light brown	SMP	10/14/2006
MT1091_ALG_0306_14Oct06.jpg	MT1091	MCS1	4484+21	-252	SE	View SE of gravel pit in fan alluvium & Tsv	ALG	10/14/2006
MT1091_ALG_0307_14Oct06.jpg	MT1091	MCS1	4484+21	-252		Poorly to moderately indurated, variably silty sand in fan alluvium	ALG	10/14/2006
MT1091_ALG_0308_14Oct06.jpg	MT1091	MCS1	4484+21	-252		Limonite-indurated sand & gravel at bottom of fan alluvium	ALG	10/14/2006
MT1091_ALG_0309_14Oct06.jpg	MT1091	MCS1	4484+21	-252		Tsv sandstone	ALG	10/14/2006
MT1091_ALG_0310_14Oct06.jpg	MT1091	MCS1	4484+21	-252		Tsv very closely fractured, tuffaceous ss	ALG	10/14/2006

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PHOTO ID	WAYPT	ROUTE	STATION	OFFSET (FEET)	DIRECTION	COMMENT	SOURCE	DATE
MT1091_ALG_0311_14Oct06.jpg	MT1091	MCS1	4484+21	-252		Borrow pit in fan alluvium and Tsv	ALG	10/14/2006
MT1091_SMP_0179_14Oct06.jpg	MT1091	MCS1	4484+21	-252	E	borrow pit view	SMP	10/14/2006
MT2001_BKR_0002_05Oct06.jpg	MT2001	MN3	696+26	4913	NE	Granitic outcrop, 3.5 mi SW of Alkali, looking NE	BKR	10/5/2006
MT2001_EAK_0001_05Oct06.jpg	MT2001	MN3	696+26	4913	W	West toward outcrops	EAK	10/5/2006
MT2001_EAK_0002_05Oct06.jpg	MT2001	MN3	696+26	4913	N	North toward outcrops	EAK	10/5/2006
MT2005_EAK_0004_06Oct06.jpg	MT2005	MN2	7229+87	-20	N	North along old railroad grade	EAK	10/6/2006
MT2006_EAK_0005_06Oct06.jpg	MT2006	MN2	7232+62	-14	E	East toward old railroad grade culvert	EAK	10/6/2006
MT2006_EAK_0006_06Oct06.jpg	MT2006	MN2	7232+62	-14	E	East, close-up of old railroad grade material	EAK	10/6/2006
MT2008_BKR_0009_06Oct06.jpg	MT2008	MN2	7210+54	-742	NE	NDOT north borrow pit ES0402, looking NE	BKR	10/6/2006
MT2008_BKR_0010_06Oct06.jpg	MT2008	MN2	7210+54	-742	SW	NDOT north borrow pit ES0402, looking SW	BKR	10/6/2006
MT2008_EAK_0008_06Oct06.jpg	MT2008	MN2	7210+54	-742		Close-up of east wall of north pit of NDOT burrow pit ES04-02	EAK	10/6/2006
MT2008_EAK_0009_06Oct06.jpg	MT2008	MN2	7210+54	-742	E	East at entire wall of NDOT burrow pit ES04-02	EAK	10/6/2006
MT2010_BKR_0014_06Oct06.jpg	MT2010	MN2	6971+91	-323	S	Klondike well, looking S	BKR	10/6/2006
MT2018_BKR_0024_06Oct06.jpg	MT2018	MN2	5658+24	15392	E	Lone Mountain granitic area; basic intrusive (left) in contact with quartz monzanite (right); field book is at contact; looking E	BKR	10/6/2006
MT2018_BKR_0025_06Oct06.jpg	MT2018	MN2	5658+24	15392	E	Lone Mountain granitic area; granitic intrusive (right) in contact with steep dipping slate (left); field book is at contact; looking E	BKR	10/6/2006
MT2018_BKR_0026_06Oct06.jpg	MT2018	MN2	5658+24	15392	E	Lone Mountain granitic area; granitic intrusive (right) in contact with steep dipping slate (left); field book is at contact; looking E	BKR	10/6/2006
MT2018_BKR_0027_06Oct06.jpg	MT2018	MN2	5658+24	15392		Lone Mountain granitic area; granitic dike intruding quartz monzanit	BKR	10/6/2006
MT2018_EAK_0015_06Oct06.jpg	MT2018	MN2	5658+24	15392	E	East toward further outcrops at higher elevations	EAK	10/6/2006
MT2018_EAK_0016_06Oct06.jpg	MT2018	MN2	5658+24	15392	S	South toward further outcrops at higher elevations	EAK	10/6/2006
MT2018_WTL_0090_07Oct06.jpg	MT2018	MN2	5658+24	15392		Lone Mtn quartz monzonite hillside photo	WTL	10/7/2006
MT2018_WTL_0091_07Oct06.jpg	MT2018	MN2	5658+24	15392		Lone Mtn outcrop; potential quarry site	WTL	10/7/2006
MT2018_WTL_0092_07Oct06.jpg	MT2018	MN2	5658+24	15392		Lone Mtn outcrop closeup	WTL	10/7/2006
MT2018_WTL_0094_07Oct06.jpg	MT2018	MN2	5658+24	15392		Larger outcrop of quartz monzonite; S side	WTL	10/7/2006
MT2019_EAK_0017_06Oct06.jpg	MT2019	MN2	5661+10	15121		Contact memamorphism between granitic pluton and sediment	EAK	10/6/2006
MT2020_BKR_0030_07Oct06.jpg	MT2020	MN2	5717+47	10678		Operationg borrow pit producing screened gravel for asphalt plan	BKR	10/7/2006
MT2020_EAK_0018_07Oct06.jpg	MT2020	MN2	5717+47	10678		Close-up of burrow source material	EAK	10/7/2006
MT2020_EAK_0019_07Oct06.jpg	MT2020	MN2	5717+47	10678		Wall of active burrow source wall	EAK	10/7/2006
MT2020_WTL_0086_07Oct06.jpg	MT2020	MN2	5717+47	10678		NDOT Pit ES 02-11 active pit for asphalt aggregate	WTL	10/7/2006
MT2020_WTL_0087_07Oct06.jpg	MT2020	MN2	5717+47	10678		NDOT Pit ES 02-11 active pit for asphalt aggregate	WTL	10/7/2006
MT2020_WTL_0088_07Oct06.jpg	MT2020	MN2	5717+47	10678		NDOT Pit ES 02-11 active pit for asphalt aggregate	WTL	10/7/2006
MT2020_WTL_0089_07Oct06.jpg	MT2020	MN2	5717+47	10678		NDOT Pit ES 02-11 active pit for asphalt aggregate	WTL	10/7/2006
MT2021_BKR_0031_07Oct06.jpg	MT2021	MN2	5480+54	13939		Granite outcrop in wash; potential quarry site	BKR	10/7/2006
MT2021_EAK_0020_07Oct06.jpg	MT2021	MN2	5480+54	13939	N	North toward possible contact between dolomite and granitics	EAK	10/7/2006
MT2021_EAK_0021_07Oct06.jpg	MT2021	MN2	5480+54	13939		Close-up of dolomite	EAK	10/7/2006
MT2021_WTL_0095_07Oct06.jpg	MT2021	MN2	5480+54	13939		Limestone outcrop at W promontory of Lone Mtn	WTL	10/7/2006
MT2022_BKR_0035_07Oct06.jpg	MT2022	MN2	5253+29	-543		Test pit in sand dune area; on alignment, 1.67 mi E MT2022	BKR	10/7/2006
MT2022_BKR_0036_07Oct06.jpg	MT2022	MN2	5253+29	-543	SW	Test pit in old RR cut; looking SW; silty sand, gravel & occ cobbles	BKR	10/7/2006
MT2028_WTL_0108_07Oct06.jpg	MT2028	MN2	5248+09	-565		Cut in old RR grade, W of McLeans	WTL	10/7/2006
MT2028_WTL_0109_07Oct06.jpg	MT2028	MN2	5248+09	-565		RR grade; layered gravelly, silty sand fil	WTL	10/7/2006
MT2029_EAK_0024_07Oct06.jpg	MT2029	MN2	5232+83	-449	W	West at wash cut face	EAK	10/7/2006
MT2029_WTL_0110_07Oct06.jpg	MT2029	MN2	5232+83	-449		Dry wash cut; stratified fine to coarse sand and fine to medium sand, and fine sandy silt	WTL	10/7/2006
MT2029_WTL_0111_07Oct06.jpg	MT2029	MN2	5232+83	-449		Dry wash cut; stratified fine to coarse sand and fine to medium sand, and fine sandy silt	WTL	10/7/2006
MT2030_BKR_0038_07Oct06.jpg	MT2030	MN2	5221+10	-286		Prospect pit, 7 ft deep; silty sand w/gravel & rounded cobbles	BKR	10/7/2006
MT2030_WTL_0113_07Oct06.jpg	MT2030	MN2	5221+10	-286		8-foot-deep shaft on desert floor	WTL	10/7/2006
MT2031_BKR_0039_07Oct06.jpg	MT2031	MN2	5187+53	-559		Cut through old RR grade; silty sand w/abun gravel & scatt cobbles	BKR	10/7/2006

PHOTO ID	WAYPT	ROUTE	STATION	OFFSET (FEET)	DIRECTION	COMMENT	SOURCE	DATE
MT2031_BKR_0040_07Oct06.jpg	MT2031	MN2	5187+53	-559		Close view: lower zone thinly stratifec	BKR	10/7/2006
MT2031_EAK_0025_07Oct06.jpg	MT2031	MN2	5187+53	-559		Old railroad grade cut face, blue tape indicates fill/native contac	EAK	10/7/2006
MT2031_EAK_0026_07Oct06.jpg	MT2031	MN2	5187+53	-559		Native material in old railroad grade	EAK	10/7/2006
MT2031_WTL_0114_07Oct06.jpg	MT2031	MN2	5187+53	-559		8-foot-high eroded old RR embankment and subgrade soil:	WTL	10/7/2006
MT2031_WTL_0115_07Oct06.jpg	MT2031	MN2	5187+53	-559		8-foot-high eroded old RR embankment and subgrade soil:	WTL	10/7/2006
MT2031_WTL_0116_07Oct06.jpg	MT2031	MN2	5187+53	-559		8-foot-high eroded old RR embankment and subgrade soil:	WTL	10/7/2006
MT2033_BKR_0043_07Oct06.jpg	MT2033	MN1	5030+07	2539		Gravel pit adjacent to SR 265; road bed fill above hammer, natural sediments below: silty sand w/occ gravel	BKR	10/7/2006
MT2033_WTL_0124_07Oct06.jpg	MT2033	MN1	5030+07	2539	SW	Pit, looking SW, County Pit	WTL	10/7/2006
MT2033_WTL_0125_07Oct06.jpg	MT2033	MN1	5030+07	2539		Stockpile closeup	WTL	10/7/2006
MT2033_WTL_0126_07Oct06.jpg	MT2033	MN1	5030+07	2539		Excavated cut face NE of stockpiles	WTL	10/7/2006
MT2034_BKR_0044_07Oct06.jpg	MT2034	MN1	5336+50	-29050		Weepah Hills: hard qtz monzanite exposed in canyon; potential quarry site	BKR	10/7/2006
MT2034_EAK_0027_07Oct06.jpg	MT2034	MN1	5336+50	-29050	S	South up small canyon in Weepah Hills granitic	EAK	10/7/2006
MT2034_WTL_0127_07Oct06.jpg	MT2034	MN1	5336+50	-29050		Weepah Hill quartz monzonite	WTL	10/7/2006
MT2034_WTL_0128_07Oct06.jpg	MT2034	MN1	5336+50	-29050		Close and closer-up of quartz monzonite	WTL	10/7/2006
MT2034_WTL_0129_07Oct06.jpg	MT2034	MN1	5336+50	-29050		Close and closer-up of quartz monzonite	WTL	10/7/2006
MT2034_WTL_0130_07Oct06.jpg	MT2034	MN1	5336+50	-29050		Overview of small arroyo in KJg	WTL	10/7/2006
MT2037_BKR_0050_08Oct06.jpg	MT2037	MN1	5260+30	3		Moderately hard, light grey ash bed	BKR	10/8/2006
MT2037_BKR_0051_08Oct06.jpg	MT2037	MN1	5260+30	3		Conglomeritic welded tuff (?	BKR	10/8/2006
MT2037_EAK_0030_08Oct06.jpg	MT2037	MN1	5260+30	3		Close-up of tuff matrix	EAK	10/8/2006
MT2037_EAK_0031_08Oct06.jpg	MT2037	MN1	5260+30	3	N	North toward breccia over tuff	EAK	10/8/2006
MT2037_WTL_0149_08Oct06.jpg	MT2037	MN1	5260+30	3		Closeup of welded tuff breccia	WTL	10/8/2006
MT2038_BKR_0055_08Oct06.jpg	MT2038	MN1	5354+49	-33	SE	Exposure in wash; on alignment, looking SE: sandy siltstone w/sparse gravel, overlain by silty conglomerate with cobbles up to 12 in diam	BKR	10/8/2006
MT2038_BKR_0056_08Oct06.jpg	MT2038	MN1	5354+49	-33	SE	Wide view of same exposure	BKR	10/8/2006
MT2038_WTL_0150_08Oct06.jpg	MT2038	MN1	5354+49	-33	W	Looking westward at SS outcrop approx. 200 feet W of alignment	WTL	10/8/2006
MT2038_WTL_0152_08Oct06.jpg	MT2038	MN1	5354+49	-33		Tilted (25 to 30 degrees) fine to medium grained SS, thinly bedded	WTL	10/8/2006
MT2038_WTL_0153_08Oct06.jpg	MT2038	MN1	5354+49	-33		Closeup of SS	WTL	10/8/2006
MT2038_WTL_0154_08Oct06.jpg	MT2038	MN1	5354+49	-33		Interbedded siltstone, sandstone, and conglomerate dipping S	WTL	10/8/2006
MT2038_WTL_0155_08Oct06.jpg	MT2038	MN1	5354+49	-33		Interbedded siltstone, sandstone, and conglomerate dipping S	WTL	10/8/2006
MT2038_WTL_0156_08Oct06.jpg	MT2038	MN1	5354+49	-33	E	Silty sandstone dipping to SE at 30 degrees	WTL	10/8/2006
MT2039_BKR_0057_08Oct06.jpg	MT2039	MN1	5414+47	1162		Siltstone: soft, tan, vy thin bdd; occ chert nodules on bedd; FeOx stained; bedding dips 38 deg at 180 Az	BKR	10/8/2006
MT2039_EAK_0032_08Oct06.jpg	MT2039	MN1	5414+47	1162		Close-up of siltstone	EAK	10/8/2006
MT2039_WTL_0158_08Oct06.jpg	MT2039	MN1	5414+47	1162		Tuffaceous siltstone	WTL	10/8/2006
MT2039_WTL_0159_08Oct06.jpg	MT2039	MN1	5414+47	1162		Tuffaceous siltstone	WTL	10/8/2006
MT2040_BKR_0058_08Oct06.jpg	MT2040	MN1	5471+94	163		Pediment(?) gravel overlying sandy siltstone	BKR	10/8/2006
MT2040_BKR_0059_08Oct06.jpg	MT2040	MN1	5471+94	163		Cross bedded sandy siltstone; bedding dips 25 deg at 040 Az	BKR	10/8/2006
MT2040_EAK_0033_08Oct06.jpg	MT2040	MN1	5471+94	163		Bedding in sandstone	EAK	10/8/2006
MT2040_EAK_0034_08Oct06.jpg	MT2040	MN1	5471+94	163		Pediment gravel	EAK	10/8/2006
MT2040_EAK_0035_08Oct06.jpg	MT2040	MN1	5471+94	163		Wash cut showing unconformable contact between underlying sandstone and pediment	EAK	10/8/2006
MT2040_WTL_0160_08Oct06.jpg	MT2040	MN1	5471+94	163		Exposure on W edge of pediment gravel	WTL	10/8/2006
MT2040_WTL_0161_08Oct06.jpg	MT2040	MN1	5471+94	163		Cross-bedded SS at lower 8 feet of slope	WTL	10/8/2006
MT2040_WTL_0162_08Oct06.jpg	MT2040	MN1	5471+94	163		Well-bedded, slightly silty sandy grave	WTL	10/8/2006
MT2040_WTL_0163_08Oct06.jpg	MT2040	MN1	5471+94	163		Pediment gravel over young Esmeralda Fm	WTL	10/8/2006
MT2041_WTL_0166_08Oct06.jpg	MT2041	MN1	5653+76	41		The Crater Quat. basalt flow and E side breached cone	WTL	10/8/2006
MT2041_WTL_0167_08Oct06.jpg	MT2041	MN1	5653+76	41		The Crater Quat. basalt flow and E side breached cone	WTL	10/8/2006
MT2041_WTL_0168_08Oct06.jpg	MT2041	MN1	5653+76	41		On the S side (slope) of the basalt flow	WTL	10/8/2006
MT2041_WTL_0169_08Oct06.jpg	MT2041	MN1	5653+76	41		On top of basalt flow, looking N on alignmen	WTL	10/8/2006

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PHOTO ID	WAYPT	ROUTE	STATION	OFFSET (FEET)	DIRECTION	COMMENT	SOURCE	DATE
MT2041_WTL_0170_08Oct06.jpg	MT2041	MN1	5653+76	41		Only outcrop of basalt on Crater basalt flow	WTL	10/8/2006
MT2041_WTL_0171_08Oct06.jpg	MT2041	MN1	5653+76	41		Only outcrop of basalt on Crater basalt flow	WTL	10/8/2006
MT2042_BKR_0065_08Oct06.jpg	MT2042	MN1	5642+20	30		View of lava from "Crater"; on alignmen	BKR	10/8/2006
MT2042_BKR_0066_08Oct06.jpg	MT2042	MN1	5642+20	30		View of lava from "Crater"; on alignmen	BKR	10/8/2006
MT2045_BKR_0071_08Oct06.jpg	MT2045	MN1	6620+44	106		Sandy silt w/abun gravel exposed in wash; potential subballast source	BKR	10/8/2006
MT2045_WTL_0178_08Oct06.jpg	MT2045	MN1	6620+44	106		Wash side cut silt sandy GRAVEL, angular lgood subballast prospect	WTL	10/8/2006
MT2046_WTL_0179_08Oct06.jpg	MT2046	MN1	6606+36	-35		Looking back eastward at Quat. ash-pumice-tuff deposit laid in narrow valley	WTL	10/8/2006
MT2046_WTL_0180_08Oct06.jpg	MT2046	MN1	6606+36	-35		Closeup of ash (pumice) layer	WTL	10/8/2006
MT2046_WTL_0181_08Oct06.jpg	MT2046	MN1	6606+36	-35		Closeup of ash (pumice) layer	WTL	10/8/2006
MT2046_WTL_0182_08Oct06.jpg	MT2046	MN1	6606+36	-35		Closeup of ash (pumice) layer	WTL	10/8/2006
MT2047_EAK_0041_08Oct06.jpg	MT2047	MN1	6592+02	-2		Contact between dolomite and conglomerate	EAK	10/8/2006
MT2047_EAK_0042_08Oct06.jpg	MT2047	MN1	6592+02	-2		Distal view of contact between dolomite and conglomerate	EAK	10/8/2006
MT2047_WTL_0183_08Oct06.jpg	MT2047	MN1	6592+02	-2		Outcrop of conglomerate and dolomite on alignmen	WTL	10/8/2006
MT2048_BKR_0072_08Oct06.jpg	MT2048	MN1	6590+75	0		Quartzite: hard, grey, fine crystalline; high angle joints at 6-12 in spacin	BKR	10/8/2006
MT2048_WTL_0186_08Oct06.jpg	MT2048	MN1	6590+75	0		Quartzite outcrop	WTL	10/8/2006
MT2048_WTL_0187_08Oct06.jpg	MT2048	MN1	6590+75	0		Phyllite, fissile	WTL	10/8/2006
MT2049_BKR_0075_09Oct06.jpg	MT2049	MN1	6585+92	90		Harkless Limestone: hard, dark grey, fine crystalline, massive bedded; abun calcite &/or dolomite veinlets; 1 inch lateral displacement on vertical veinlet	BKR	10/9/2006
MT2049_BKR_0076_09Oct06.jpg	MT2049	MN1	6585+92	90		Harkless Limestone: high angle joints strike at 025 Az & 115 Az	BKR	10/9/2006
MT2049_BKR_0077_09Oct06.jpg	MT2049	MN1	6585+92	90		Harkless Limestone: high angle joints strike at 025 Az & 115 Az	BKR	10/9/2006
MT2049_EAK_0043_08Oct06.jpg	MT2049	MN1	6585+92	90		Breccia material between upper dolomite and lower dolomite	EAK	10/8/2006
MT2049_EAK_0044_08Oct06.jpg	MT2049	MN1	6585+92	90		Close-up of breccia material between upper dolomite and lower dolomite	EAK	10/8/2006
MT2049_WTL_0188_08Oct06.jpg	MT2049	MN1	6585+92	90		Unstable rock slope	WTL	10/8/2006
MT2049_WTL_0189_08Oct06.jpg	MT2049	MN1	6585+92	90		Unstable rock slope	WTL	10/8/2006
MT2049_WTL_0190_08Oct06.jpg	MT2049	MN1	6585+92	90		Unstable rock slope	WTL	10/8/2006
MT2049_WTL_0191_08Oct06.jpg	MT2049	MN1	6585+92	90		Harkless rocks dipping 20 degrees toward valley	WTL	10/8/2006
MT2049_WTL_0192_08Oct06.jpg	MT2049	MN1	6585+92	90		Contact (fault) of two units, one has crushed zone 1-inch-thick	WTL	10/8/2006
MT2049_WTL_0193_08Oct06.jpg	MT2049	MN1	6585+92	90		Contact (fault) of two units, one has crushed zone 1-inch-thick	WTL	10/8/2006
MT2050_BKR_0078_09Oct06.jpg	MT2050	MN1	6582+51	68	SW	Harkless Limestone terrane: view of alignment looking SW	BKR	10/9/2006
MT2050_BKR_0079_09Oct06.jpg	MT2050	MN1	6582+51	68	NE	Harkless Limestone terrane: view of alignment looking NI	BKR	10/9/2006
MT2051_BKR_0080_09Oct06.jpg	MT2051	MN1	6580+05	18		Harkless Limestone: close spaced intersecting joints	BKR	10/9/2006
MT2053_BKR_0081_09Oct06.jpg	MT2053	MN1	6573+90	-48		Harkless Limestone: close spaced intersecting joints	BKR	10/9/2006
MT2054_BKR_0083_09Oct06.jpg	MT2054	MN1	6570+74	101		Harkless Limestone: hard, tan, fine crystalline, thin bedded, FeOx stained; possible algal origin; overlies hard phyllitic siltstone with tiny, sparse garnets	BKR	10/9/2006
MT2054_EAK_0047_09Oct06.jpg	MT2054	MN1	6570+74	101		Fossil Archeocyathid	EAK	10/9/2006
MT2054_EAK_0048_09Oct06.jpg	MT2054	MN1	6570+74	101		Algal mat limestone	EAK	10/9/2006
MT2057_BKR_0086_09Oct06.jpg	MT2057	MN1	6546+44	38	NE	View from alignment, looking NE at planned cut through ridge	BKR	10/9/2006
MT2060_BKR_0089_10Oct06.jpg	MT2060	MN1	7844+91	732		Medium dense, tan sandy silt; variable gravel content; carbonate cement at top of section	BKR	10/10/2006
MT2060_BKR_0090_10Oct06.jpg	MT2060	MN1	7844+91	732		Medium dense, tan sandy silt; variable gravel content; carbonate cement at top of section	BKR	10/10/2006
MT2060_BKR_0091_10Oct06.jpg	MT2060	MN1	7844+91	732		Medium dense, tan sandy silt; variable gravel content; carbonate cement at top of section	BKR	10/10/2006
MT2062_BKR_0092_10Oct06.jpg	MT2062	MN1	7881+99	-248		Dense, tan sandy silt; abundant angular gravel; weak carbonate cement at top 4 ft of section	BKR	10/10/2006
MT2062_EAK_0050_10Oct06.jpg	MT2062	MN1	7881+99	-248		Wash cut	EAK	10/10/2006
MT2064_BKR_0094_10Oct06.jpg	MT2064	MN1	7954+62	185		Dense, tan silty sand; scatt angular gravel; weak carbonate cement	BKR	10/10/2006
MT2065_BKR_0095_10Oct06.jpg	MT2065	MN1	8008+27	75		Medium dense, tan silty sand; scatt fine subangular gravel; weak carbonate cement (weaker than previous exposure)	BKR	10/10/2006

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PHOTO ID	WAYPT	ROUTE	STATION	OFFSET (FEET)	DIRECTION	COMMENT	SOURCE	DATE
MT2067_BKR_0096_10Oct06.jpg	MT2067	MN1	8043+58	-273		Very hard, high strength, red-grey, fine crystalline quartzite; close spaced jointing dips 82 deg at 234 Az & 70 deg at 258 Az	BKR	10/10/2006
MT2068_BKR_0097_10Oct06.jpg	MT2068	MN1	8080+52	325		Mule Spring Limestone: hard, dark grey, fine crystalline, thick bedded; abun carbonate veinlets; locally abundant spheroidal fossils(?) up to 1/2 in diam; bedding dips 5 deg at 165 Az	BKR	10/10/2006
MT2070_BKR_0099_10Oct06.jpg	MT2070	MN1	8121+93	183		Subcropping Harkless(?) Shale: olive green, platy, weathered; may not be in plac	BKR	10/10/2006
MT2070_BKR_0100_10Oct06.jpg	MT2070	MN1	8121+93	183		Subcropping Harkless(?) Shale: olive green, platy, weathered; bedding dips 11 degrees at 190 Az	BKR	10/10/2006
MT2070_EAK_0053_10Oct06.jpg	MT2070	MN1	8121+93	183			EAK	10/10/2006
MT2072_BKR_0102_10Oct06.jpg	MT2072	MN1	8201+03	285		Hard, tan, dense silty & sandy gravel overlying medium dense, tan silt with scatt cobbles & gravel	BKR	10/10/2006
MT2073_BKR_0103_10Oct06.jpg	MT2073	MN1	8224+14	255		Hard, tan, sandy gravel w/cobbles up to 8 in diam, overlying moderately hard, tan sandy silt with sparse fine gravel; carbonate cement	BKR	10/10/2006
MT2074_BKR_0104_10Oct06.jpg	MT2074	MN1	8253+42	-85		Moderately hard, tan silt w/carbonate cement, sparse gravel (24" thick), overlying hard, brown sandy silt with carbonate cement & abun coarse gravel (24" thick); overlying moderately hard, tan, sandy silt with carbonate cement & sparse gravel (24" thick)	BKR	10/10/2006
MT2075_BKR_0105_10Oct06.jpg	MT2075	MN1	8275+88	217		Limestone: moderately hard, red-brown, thin bedded, sandy; fossil fragments; bedding dips 15 degrees at 345 Az	BKR	10/10/2006
MT2075_EAK_0054_10Oct06.jpg	MT2075	MN1	8275+88	217		Fossils in sandstone unit	EAK	10/10/2006
MT2076_BKR_0107_10Oct06.jpg	MT2076	MN2	6281+96	30925	W	Lone Mountain/Springdale Canyon area: panoramic view of canyon looking V	BKR	10/10/2006
MT2076_BKR_0108_10Oct06.jpg	MT2076	MN2	6281+96	30925	NW	Lone Mountain/Springdale Canyon area: panoramic view of canyon looking NV	BKR	10/10/2006
MT2076_EAK_0055_11Oct06.jpg	MT2076	MN2	6281+96	30925		Joint set (075, 64) in quartz monzonite/granodiorite	EAK	10/11/2006
MT2077_BKR_0113_10Oct06.jpg	MT2077	MN2	6393+79	32163	SE	Lone Mountain/Weepah Hills/Paymaster Canyon area: panoramic view of potential granitic ballast area; looking SE	BKR	10/10/2006
MT2077_BKR_0115_10Oct06.jpg	MT2077	MN2	6393+79	32163		Lone Mountain/Weepah Hills/Paymaster Canyon area: weathered granitic outcro	BKR	10/10/2006
MT2078_BKR_0117_10Oct06.jpg	MT2078	MN3	602+87	-14866		Montezuma Range/Indian Spring area: weathered basaltic outcrop	BKR	10/10/2006
MT2078_BKR_0118_10Oct06.jpg	MT2078	MN3	602+87	-14866		Montezuma Range/Indian Spring area: largest basaltic outcrop in are	BKR	10/10/2006
MT2079_EAK_0059_11Oct06.jpg	MT2079	MN3	594+38	-14617		Brecciated flow seperation	EAK	10/11/2006
MT2080_EAK_0060_11Oct06.jpg	MT2080	MN3	651+89	-12319	N	North toward inaccessible outcrop	EAK	10/11/2006
MT2082_BKR_0132_12Oct06.jpg	MT2082	MN1	6203+80	6	S	Angel Island: test pit - silty SAND: tan, mod dense, weakly cemented; looking soutl	BKR	10/12/2006
MT2084_BKR_0138_12Oct06.jpg	MT2084	MN1	6236+10	635	NE	Angel Island: Intermittent layers moderately hard ash falls/flows and softer playa clays; looking NE	BKR	10/12/2006
MT2084_EAK_0062_12Oct06.jpg	MT2084	MN1	6236+10	635		View of benched ash flow cuts	EAK	10/12/2006
MT2084_EAK_0063_12Oct06.jpg	MT2084	MN1	6236+10	635	N	North up wash cut	EAK	10/12/2006
MT3004_WTL_0004_04Oct06.jpg	MT3004	MN2	7498+47	-1989		NDOT Pit ES 04-08, N of Goldfield	WTL	10/4/2006
MT3011_WTL_0017_04Oct06.jpg	MT3011	MCS1	4485+42	-38		NDOT Pit ES 02-03 E of Coaldale	WTL	10/4/2006
MT3012_WTL_0019_04Oct06.jpg	MT3012	MCS1	3690+09	609		NDT Pit ES 05-01	WTL	10/4/2006
MT3024_WTL_0082_06Oct06.jpg	MT3024	S3	NA	NA		Weber Dam quarry site; quartz monzonite	WTL	10/6/2006
MT3024_WTL_0083_06Oct06.jpg	MT3024	S3	NA	NA		Weber Dam quarry site; quartz monzonite	WTL	10/6/2006
MT3024_WTL_0084_06Oct06.jpg	MT3024	S3	NA	NA		Weber Dam quarry site; quartz monzonite	WTL	10/6/2006
MT3024_WTL_0085_06Oct06.jpg	MT3024	S3	NA	NA		Weber Dam quarry site; quartz monzonite	WTL	10/6/2006
MT3025_WTL_0330_16Nov06.jpg	MT3025	MCS1	1410+13	9320		Garfield Hills quarry site	WTL	11/16/2006
MT3025_WTL_0331_16Nov06.jpg	MT3025	MCS1	1410+13	9320		Garfield Hills quarry site	WTL	11/16/2006
MT3025_WTL_0332_16Nov06.jpg	MT3025	MCS1	1410+13	9320		Garfield Hills quarry site	WTL	11/16/2006
MT3025_WTL_0333_16Nov06.jpg	MT3025	MCS1	1410+13	9320		Garfield Hills rock closeup	WTL	11/16/2006
MT3026_WTL_0196_09Oct06.jpg	MT3026	MN1	6711+61	-79		Cut bank and TP ridge and Swale relief at approx. 5 to 20 feet, amplitude of ridges approx. 100 to 150 feet	WTL	10/9/2006
MT3027_WTL_0197_09Oct06.jpg	MT3027	MN1	6739+49	-51		4.5 feet high W edge of dry wash, slity sandy to sandy, silty GRAVEL (angular clasts)	WTL	10/9/2006

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PHOTO ID	WAYPT	ROUTE	STATION	OFFSET (FEET)	DIRECTION	COMMENT	SOURCE	DATE
MT3027_WTL_0198_09Oct06.jpg	MT3027	MN1	6739+49	-51		4.5 feet high W edge of dry wash, slity sandy to sandy, silty GRAVEL (angular clasts)	WTL	10/9/2006
MT3029_WTL_0200_09Oct06.jpg	MT3029	MN1	6764+89	428		Green slate exposure (small expos)	WTL	10/9/2006
MT3029_WTL_0201_09Oct06.jpg	MT3029	MN1	6764+89	428		Green slate exposure (small expos)	WTL	10/9/2006
MT3030_WTL_0202_09Oct06.jpg	MT3030	MN1	6783+51	322	NW	Slate outcrop dipping S	WTL	10/9/2006
MT3031_WTL_0203_09Oct06.jpg	MT3031	MN1	6792+45	277		Facies change from slate to silty SS, greer	WTL	10/9/2006
MT3031_WTL_0204_09Oct06.jpg	MT3031	MN1	6792+45	277		Facies change from slate to silty SS, greer	WTL	10/9/2006
MT3032_WTL_0207_09Oct06.jpg	MT3032	MN1	6793+96	93		Exposure of slate dipping N (N limb of anticline	WTL	10/9/2006
MT3034_WTL_0208_09Oct06.jpg	MT3034	MN1	6803+06	107		Quartzite outcrop in draw on alignmen	WTL	10/9/2006
MT3036_WTL_0209_09Oct06.jpg	MT3036	MN1	6810+49	-33		Quartz monzonite outcrop on narrow ridge (approx. 150 feet wide	WTL	10/9/2006
MT3037_WTL_0211_09Oct06.jpg	MT3037	MN1	6813+84	-196		Test trench prospect	WTL	10/9/2006
MT3038_WTL_0212_09Oct06.jpg	MT3038	MN1	6825+98	-212		Granodiorite knob, just E of alignmen	WTL	10/9/2006
MT3038_WTL_0213_09Oct06.jpg	MT3038	MN1	6825+98	-212		Closeup of granodiorite outcrop	WTL	10/9/2006
MT3039_WTL_0215_09Oct06.jpg	MT3039	MN1	6852+33	1177		Small TP in side of dry wash, gravelly, fine sandy SILT	WTL	10/9/2006
MT3040_WTL_0216_09Oct06.jpg	MT3040	MN3	766+49	520		Test hole with slightly sandy, angular to subangular GRAVEL, trace silt, beautiful subballas and embankment	WTL	10/9/2006
MT3041_WTL_0217_09Oct06.jpg	MT3041	MN1	6895+54	23		Test hole on N side of wash slightly silty, sandy GRAVEL	WTL	10/9/2006
MT3042_WTL_0220_09Oct06.jpg	MT3042	MN1	6922+46	294		Test hole in S side of wash, silty, fine to coarse SAND, trace gravel	WTL	10/9/2006
MT3043_WTL_0221_09Oct06.jpg	MT3043	MN1	6932+80	307		Test hole in S side of dry wash approx 2 feet deep	WTL	10/9/2006
MT3044_WTL_0222_09Oct06.jpg	MT3044	MN1	6965+50	658		10-foot cut into S side of dry wash, slightly silty to silty, gravelly SANI	WTL	10/9/2006
MT3045_WTL_0223_09Oct06.jpg	MT3045	MN1	7061+31	129		8- to 9-foot cut bank in wash on RR alignment, slightly silty, sandy GRAVEL, upper 12 to 15 inches is rich in calcrete	WTL	10/9/2006
MT3045_WTL_0224_09Oct06.jpg	MT3045	MN1	7061+31	129		8- to 9-foot cut bank in wash on RR alignment, slightly silty, sandy GRAVEL, upper 12 to 15 inches is rich in calcrete	WTL	10/9/2006
MT3045_WTL_0225_09Oct06.jpg	MT3045	MN1	7061+31	129		8-to 9-foot cut bank in wash on RR alignment, slightly silty, sandy GRAVEL, upper 12 to 15 inches is rich in calcrete	WTL	10/9/2006
MT3046_WTL_0227_09Oct06.jpg	MT3046	MN1	7223+10	4		On alignment, slightly silty, sandy GRAVEL, dense, angular, trace cobbles; old dissected fan	WTL	10/9/2006
MT3046_WTL_0228_09Oct06.jpg	MT3046	MN1	7223+10	4		On alignment, slightly silty, sandy GRAVEL, dense, angular, trace cobbles, old dissected fan	WTL	10/9/2006
MT3047_WTL_0232_10Oct06.jpg	MT3047	MN1	7264+54	29		Test hole on N side of dry wash; W of Montezuma Pass	WTL	10/10/2006
MT3048_WTL_0233_10Oct06.jpg	MT3048	MN1	7313+73	-521		Ash (tuff) outcrop, tuff with gravel (fan) a few feet thick overlyin;	WTL	10/10/2006
MT3049_WTL_0234_10Oct06.jpg	MT3049	MN1	7304+39	143	SW	S-dipping outcrop of welded tuff (typical of area	WTL	10/10/2006
MT3049_WTL_0235_10Oct06.jpg	MT3049	MN1	7304+39	143	SW	S-dipping outcrop of welded tuff (typical of area	WTL	10/10/2006
MT3050_WTL_0240_10Oct06.jpg	MT3050	MN1	7299+16	-207		Small outcrop of welded tuff with limestone chunks (tuff breccia	WTL	10/10/2006
MT3051_WTL_0242_10Oct06.jpg	MT3051	MN1	7293+28	532		Large (60-foot-high) outcrop of light gray,weak (locally friable) tuff, non-uniform jointing, local 1- to 2-foot cores and small rugs	WTL	10/10/2006
MT3051_WTL_0243_10Oct06.jpg	MT3051	MN1	7293+28	532		Closeup of tuff with cavity	WTL	10/10/2006
MT3052_WTL_0244_10Oct06.jpg	MT3052	MN1	7290+15	116		Large outcrop on N side of ridge, tuff, white to buff, very weak fine grained jointed 3 to 18 inches relatively massive	WTL	10/10/2006
MT3052_WTL_0245_10Oct06.jpg	MT3052	MN1	7290+15	116	SE	Cavernous tuff, looking back SE	WTL	10/10/2006
MT3054_WTL_0247_10Oct06.jpg	MT3054	MN1	7332+27	358		Unknown metamorphic approx halfway uphill, probably Zd uni	WTL	10/10/2006
MT3054_WTL_0248_10Oct06.jpg	MT3054	MN1	7332+27	358		Overlying rhyolite unit at top of hill on S side of pas:	WTL	10/10/2006
MT3056_WTL_0249_10Oct06.jpg	MT3056	MN1	7332+38	383		Rhyolite outcrop at Montezuma Pass	WTL	10/10/2006
MT3056_WTL_0250_10Oct06.jpg	MT3056	MN1	7332+38	383		Rhyolite outcrop at Montezuma Pass	WTL	10/10/2006
MT3056_WTL_0251_10Oct06.jpg	MT3056	MN1	7332+38	383		Rhyolite outcrop at Montezuma Pass	WTL	10/10/2006
MT3058_WTL_0254_10Oct06.jpg	MT3058	MN1	7332+54	-320		Quartzite-Tertiary ash flow contact	WTL	10/10/2006
MT3058_WTL_0255_10Oct06.jpg	MT3058	MN1	7332+54	-320		Quartzite-Tertiary ash flow contact	WTL	10/10/2006
MT3058_WTL_0257_10Oct06.jpg	MT3058	MN1	7332+54	-320		Quartzite outcrop at Montezuma Pass	WTL	10/10/2006
MT3060_WTL_0258_10Oct06.jpg	MT3060	MN1	7367+62	-374		Outcrops of older tuffs and tuff breccias E of Montezuma Pas:	WTL	10/10/2006

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PHOTO ID	WAYPT	ROUTE	STATION	OFFSET (FEET)	DIRECTION	COMMENT	SOURCE	DATE
MT3060_WTL_0259_10Oct06.jpg	MT3060	MN1	7367+62	-374		Outcrops of older tuffs and tuff breccias E of Montezuma Pass	WTL	10/10/2006
MT3060_WTL_0260_10Oct06.jpg	MT3060	MN1	7367+62	-374		Outcrops of older tuffs and tuff breccias E of Montezuma Pass	WTL	10/10/2006
MT4001_BKR_0152_28Oct06.jpg	MT4001	MN1	8444+03	-584		Lida Jct: basaltic outcrop on alignment	BKR	10/28/2006
MT4001_BKR_0153_28Oct06.jpg	MT4001	MN1	8444+03	-584		Lida Jct: paleolithic chert fragments	BKR	10/28/2006
MT4002_BKR_0154_28Oct06.jpg	MT4002	MN1	8402+52	-19		Lida Jct: Qao exposed in wash	BKR	10/28/2006
MT4003_BKR_0155_28Oct06.jpg	MT4003	MN1	8382+04	-527		Lida Jct: soft welded ash with angular inclusions of basalt & andesite	BKR	10/28/2006
MT4003_BKR_0156_28Oct06.jpg	MT4003	MN1	8382+04	-527		Lida Jct: soft welded ash with angular inclusions of basalt & andesite	BKR	10/28/2006
MT4004_BKR_0157_28Oct06.jpg	MT4004	MN1	7669+47	-10093	E	Basalt flows in northern area of interest; active mining claims(?); looking E	BKR	10/28/2006
MT4005_BKR_0158_28Oct06.jpg	MT4005	MN1	7685+85	-11725	SW	Basalt flows in southern area of interest; basaltic outcrops; looking SW	BKR	10/28/2006
MT4005_BKR_0159_28Oct06.jpg	MT4005	MN1	7685+85	-11725	S	Basalt flows in southern area of interest; basaltic outcrops; looking S	BKR	10/28/2006
MT4006_BKR_0161_28Oct06.jpg	MT4006	MN1	7698+32	-12636	W	Basalt flows in southern area of interest; basaltic outcrops; looking W	BKR	10/28/2006
MT4006_BKR_0162_28Oct06.jpg	MT4006	MN1	7698+32	-12636	E	Basalt flows in southern area of interest; basaltic outcrops; looking E	BKR	10/28/2006
MT4007_BKR_0164_28Oct06.jpg	MT4007	MN1	6828+13	-286	N	Panoramic view of granodiorite (?) sampled area; looking N	BKR	10/28/2006
MT4007_BKR_0165_28Oct06.jpg	MT4007	MN1	6828+13	-286	NE	Panoramic view of granodiorite(?) sampled area: looking NE	BKR	10/28/2006
MT4007_BKR_0166_28Oct06.jpg	MT4007	MN1	6828+13	-286	SE	Panoramic view of granodiorite(?) sampled area; looking SE	BKR	10/28/2006
MT4008_BKR_0167_31Oct06.jpg	MT4008	MCS1	2346+35	-4525	W	Contact between 2 intrusive units, S end of outcrop; looking W	BKR	10/31/2006
MT4008_BKR_0168_31Oct06.jpg	MT4008	MCS1	2346+35	-4525	NW	View of outcrop along wash; looking NW	BKR	10/31/2006
MT4008_BKR_0170_31Oct06.jpg	MT4008	MCS1	2346+35	-4525	W	Close jointing, 50/282 & 75/310; looking W	BKR	10/31/2006
MT4008_BKR_0171_31Oct06.jpg	MT4008	MCS1	2346+35	-4525	W	Close jointing, 50/282 & 75/310; looking W	BKR	10/31/2006
MT4008_BKR_0172_31Oct06.jpg	MT4008	MCS1	2346+35	-4525	NW	Contact between 2 intrusive units, N end of outcrop; looking NW	BKR	10/31/2006
MT4008_BKR_0173_31Oct06.jpg	MT4008	MCS1	2346+35	-4525		Using the Schmidt-Hammer instrument on an outcrop	BKR	10/31/2006
MT4008_BKR_0174_31Oct06.jpg	MT4008	MCS1	2346+35	-4525	SW	Panorama of sampled outcrop; looking SW	BKR	10/31/2006
MT4008_BKR_0175_31Oct06.jpg	MT4008	MCS1	2346+35	-4525	W	Panorama of sampled outcrop; looking W	BKR	10/31/2006
MT4008_BKR_0176_31Oct06.jpg	MT4008	MCS1	2346+35	-4525	NW	Panorama of sampled outcrop; looking NW	BKR	10/31/2006
MT4009_BKR_0177_02Nov06.jpg	MT4009	MCS1	1413+41	9043	N	Panorama of sampled outcrop; looking N	BKR	11/2/2006
MT4009_BKR_0178_02Nov06.jpg	MT4009	MCS1	1413+41	9043	NE	Panorama of sampled outcrop; looking NE	BKR	11/2/2006
MT4009_BKR_0179_02Nov06.jpg	MT4009	MCS1	1413+41	9043	E	Panorama of sampled outcrop; looking E	BKR	11/2/2006
MT4009_BKR_0180_02Nov06.jpg	MT4009	MCS1	1413+41	9043	SE	Panorama of sampled outcrop; looking SE	BKR	11/2/2006
MT4009_BKR_0182_02Nov06.jpg	MT4009	MCS1	1413+41	9043	SE	Rubble(?) zone within flow; looking SE	BKR	11/2/2006
MT4009_BKR_0183_02Nov06.jpg	MT4009	MCS1	1413+41	9043	S	Rubble(?) zone within flow; looking S	BKR	11/2/2006
MT4010_BKR_0184_03Nov06.jpg	MT4010	S3	10000+41	5071	S	Panorama of sampled outcrop; looking S	BKR	11/3/2006
MT4010_BKR_0185_03Nov06.jpg	MT4010	S3	10000+41	5071	SE	Panorama of sampled outcrop; looking SE	BKR	11/3/2006
MT4010_BKR_0186_03Nov06.jpg	MT4010	S3	10000+41	5071	E	Panorama of sampled outcrop; looking E	BKR	11/3/2006
MT4010_BKR_0187_03Nov06.jpg	MT4010	S3	10000+41	5071	NE	Panorama of sampled outcrop; looking NE	BKR	11/3/2006
MT4010_BKR_0188_03Nov06.jpg	MT4010	S3	10000+41	5071	N	Panorama of sampled outcrop; looking N	BKR	11/3/2006
MT5006_WTL_0271_14Nov06.jpg	MT5006	MN1	7704+74	-13906	S	Looking south at outcrop sampled, Malpais S	WTL	11/14/2006
MT5007_WTL_0272_14Nov06.jpg	MT5007	MN1	7706+32	-13308		Sampled outcrop at Malpais S	WTL	11/14/2006
MT5007_WTL_0273_14Nov06.jpg	MT5007	MN1	7706+32	-13308		Sampled outcrop at Malpais S	WTL	11/14/2006
MT5010_WTL_0281_14Nov06.jpg	MT5010	MN1	6590+47	-183	NW	North-dipping dolomite at Clayton Pass	WTL	11/14/2006
MT5010_WTL_0282_14Nov06.jpg	MT5010	MN1	6590+47	-183	SW	North-dipping dolomite at Clayton Pass	WTL	11/14/2006
MT5010_WTL_0283_14Nov06.jpg	MT5010	MN1	6590+47	-183		North-dipping slab failures	WTL	11/14/2006
MT5010_WTL_0284_14Nov06.jpg	MT5010	MN1	6590+47	-183	SW	North-dipping slab failures	WTL	11/14/2006
MT5010_WTL_0285_14Nov06.jpg	MT5010	MN1	6590+47	-183	W	North-dipping slab failures	WTL	11/14/2006
MT5013_WTL_0291_14Nov06.jpg	MT5013	MN1	6586+26	-673	S	Panorama of slabbing slope, Clayton Pass	WTL	11/14/2006
MT5017_WTL_0303_15Nov06.jpg	MT5017	MN2	5715+74	9728		Reclaimed NDOT pit ES02-11	WTL	11/15/2006
MT5017_WTL_0304_15Nov06.jpg	MT5017	MN2	5715+74	9728		Reclaimed NDOT pit ES02-11	WTL	11/15/2006
MT5017_WTL_0305_15Nov06.jpg	MT5017	MN2	5715+74	9728		Reclaimed NDOT pit ES02-11	WTL	11/15/2006
MT5020_WTL_0314_15Nov06.jpg	MT5020	MCS1	2309+78	-10023		North end of Gabbs pit outcrop	WTL	11/15/2006
MT5020_WTL_0315_15Nov06.jpg	MT5020	MCS1	2309+78	-10023		Toe of slope at Gabbs quarry	WTL	11/15/2006
MT5020_WTL_0316_15Nov06.jpg	MT5020	MCS1	2309+78	-10023		Quartz monzonite outcrop at Gabbs	WTL	11/15/2006

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PHOTO ID	WAYPT	ROUTE	STATION	OFFSET (FEET)	DIRECTION	COMMENT	SOURCE	DATE
MT5020_WTL_0317_15Nov06.jpg	MT5020	MCS1	2309+78	-10023		Joint pattern in quartz monzonite at Gabbs	WTL	11/15/2006
MT5021_WTL_0318_15Nov06.jpg	MT5021	MCS1	4520+81	21		Welded tuff outcrop at Coaldale	WTL	11/15/2006
MT5021_WTL_0319_15Nov06.jpg	MT5021	MCS1	4520+81	21		Tuffaceous hills at Coaldale	WTL	11/15/2006
MT5021_WTL_0320_15Nov06.jpg	MT5021	MCS1	4520+81	21		Vuggy tuffaceous beds at Coaldale	WTL	11/15/2006
MT5023_WTL_0326_15Nov06.jpg	MT5023	S3	10611+53	2705		North-dipping granular deposits in cu	WTL	11/15/2006
MT5023_WTL_0327_15Nov06.jpg	MT5023	S3	10611+53	2705		North-dipping seds along dry wash	WTL	11/15/2006
MT5023_WTL_0328_15Nov06.jpg	MT5023	S3	10611+53	2705		North-dipping granular seds	WTL	11/15/2006
MT5023_WTL_0329_15Nov06.jpg	MT5023	S3	10611+53	2705		North-dipping granular seds	WTL	11/15/2006
MT5023_WTL_0336_16Nov06.jpg	MT5023	S3	10611+53	2705		Road cut in dune sand (Qe) at Schurz	WTL	11/16/2006
MT7001_WTL_0361_18Feb07.jpg	MT7001	MN1	8280+39	1383		NDOT Pit ES 03-08 appears to be part bedrock quarry and part alluvial fan.	WTL	2/18/2007
MT7001_WTL_0362_18Feb07.jpg	MT7001	MN1	8280+39	1383		NDOT Pit ES 03-08 appears to be part bedrock quarry and part alluvial fan.	WTL	2/18/2007
MT7003_WTL_0365_18Feb07.jpg	MT7003	MN1	7501+60	525		Tuff (Tt3) outcrop, approx. 6' high	WTL	2/18/2007
MT7003_WTL_0366_18Feb07.jpg	MT7003	MN1	7501+60	525		Tuff (Tt3) outcrop, approx. 6' high	WTL	2/18/2007
MT7005_WTL_0368_18Feb07.jpg	MT7005	MN1	7531+89	4		Tuff (Tt3) outcrop	WTL	2/18/2007
MT7007_WTL_0369_19Feb07.jpg	MT7007	MN2	7368+23	-3496		Gravel pit excavation reclaimed.	WTL	2/19/2007
MT7007_WTL_0370_19Feb07.jpg	MT7007	MN2	7368+23	-3496		Stock piles on north side of NDOT Pit ES 04-01.	WTL	2/19/2007
MT7010_WTL_0376_19Feb07.jpg	MT7010	MN3	418+43	-2834		Closeup of small mound from test pit excavation	WTL	2/19/2007
MT7010_WTL_0377_19Feb07.jpg	MT7010	MN3	418+43	-2834		Overview of small mound from test pit excavation	WTL	2/19/2007
MT7011_WTL_0378_19Feb07.jpg	MT7011	MN3	396+68	-532		Closeup of welded TUFF outcrop.	WTL	2/19/2007
MT7011_WTL_0379_19Feb07.jpg	MT7011	MN3	396+68	-532		Red rock knob.	WTL	2/19/2007
MT7013_WTL_0381_19Feb07.jpg	MT7013	MN3	490+83	-121	E	Test pit on east side of wash.	WTL	2/19/2007
MT7014_WTL_0382_19Feb07.jpg	MT7014	MN3	485+01	-86	W	Dry wash bank and test hole.	WTL	2/19/2007
MT7014_WTL_0383_19Feb07.jpg	MT7014	MN3	485+01	-86	W	Closeup of dry wash bank and test hole.	WTL	2/19/2007
MT7015_WTL_0384_19Feb07.jpg	MT7015	MN3	505+50	-3		Dry wash with ephemeral channel.	WTL	2/19/2007
MT7017_WTL_0386_19Feb07.jpg	MT7017	MN3	537+53	73		Test hole at edge of wide dry wash.	WTL	2/19/2007
MT7027_WTL_0395_19Feb07.jpg	MT7027	MN3	427+47	568		Outcrop of Siebert Tuff (Tt3) in dry wash.	WTL	2/19/2007
MT7031_WTL_0399_20Feb07.jpg	MT7031	MN3	704+49	-186		Dry wash with small TUFF (100ft2) exposure	WTL	2/20/2007
MT7032_WTL_0400_20Feb07.jpg	MT7032	MN3	683+33	22		Closeup of test hole in small dry wash ~6' deep (Qao).	WTL	2/20/2007
MT7032_WTL_0401_20Feb07.jpg	MT7032	MN3	683+33	22		Overview of test hole in small dry wash ~6' deep (Qao).	WTL	2/20/2007
MT7033_WTL_0402_20Feb07.jpg	MT7033	MN3	669+99	157		Granite outcrop; moderately weathered.	WTL	2/20/2007
MT7036_WTL_0406_20Feb07.jpg	MT7036	MN3	650+34	-32		Test hole in grus	WTL	2/20/2007
MT7038_WTL_0407_20Feb07.jpg	MT7038	MN3	622+08	-410		Closeup of tuff exposure.	WTL	2/20/2007
MT7038_WTL_0408_20Feb07.jpg	MT7038	MN3	622+08	-410		Overview of tuff exposure.	WTL	2/20/2007
MT7039_WTL_0409_20Feb07.jpg	MT7039	MN3	600+70	-491	S	Northern toe of Tuff hill.	WTL	2/20/2007
MT7040_WTL_0411_20Feb07.jpg	MT7040	MN3	600+04	-695		Tt3 outcrop	WTL	2/20/2007
MT7041_WTL_0413_20Feb07.jpg	MT7041	MN3	596+03	-17		Test hole in side of dry wash; Qao.	WTL	2/20/2007
MT7043_WTL_0415_20Feb07.jpg	MT7043	MN2	4826+53	105	W	NDOT Pit ES 2-06	WTL	2/20/2007
MT7044_WTL_0416_20Feb07.jpg	MT7044	MCS1	4273+21	1610	E	View of NDOT Pit ES 05-02 face.	WTL	2/20/2007
MT7045_WTL_0417_20Feb07.jpg	MT7045	MCS1	3916+71	7453		View of borrow pit cut face - west side.	WTL	2/20/2007
MT7046_WTL_0418_20Feb07.jpg	MT7046	MCS1	3122+63	13334		NDOT Pit MI 01-03	WTL	2/20/2007
MT7047_WTL_0419_20Feb07.jpg	MT7047	MCS1	2846+84	6753		NDOT Pit MI 01-04	WTL	2/20/2007
MT7048_WTL_0420_20Feb07.jpg	MT7048	MCS1	2771+67	7956		NDOT Pit MI 01-06A	WTL	2/20/2007
MT7049_WTL_0421_20Feb07.jpg	MT7049	MCS1	2500+10	13112		NDOT Pit MI 01-08	WTL	2/20/2007
MT7050_WTL_0422_20Feb07.jpg	MT7050	MCS1	2180+08	8005		NDOT Pit MI 01-09	WTL	2/20/2007
MT7051_WTL_0423_21Feb07.jpg	MT7051	S6	11043+50	-1942		NDOT Pit CH 08-04	WTL	2/21/2007
MT7051_WTL_0424_21Feb07.jpg	MT7051	S6	11043+50	-1942		NDOT Pit CH 08-04	WTL	2/21/2007
MT7053_WTL_0427_21Feb07.jpg	MT7053	S5	10212+35	1748		Test hole in brown, silty, fine SAND.	WTL	2/21/2007
MT7054_WTL_0428_21Feb07.jpg	MT7054	S5	10194+37	1206	NE	View up fan toward bedrock outcrop.	WTL	2/21/2007
MT7062_WTL_0434_22Feb07.jpg	MT7062	S6	11029+59	-1392		Test hole showing horizontally bedded, silty, fine SAND and fine sandy SILT	WTL	2/22/2007
MT7063_WTL_0435_22Feb07.jpg	MT7063	S6	11021+88	-1140		Bank of dry wash; site of Qay debris flow	WTL	2/22/2007

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PHOTO ID	WAYPT	ROUTE	STATION	OFFSET (FEET)	DIRECTION	COMMENT	SOURCE	DATE
MT7065_WTL_0438_22Feb07.jpg	MT7065	S6	11010+07	-1024		Test hole at top of higher terrace alluvium (Qay2	WTL	2/22/2007
MT7068_WTL_0439_23Feb07.jpg	MT7068	MCS1	NA	NA	NW	Test hole showing slightly fine gravelly, silty, fine SAND/fine sandy SILT (Ql	WTL	2/23/2007
MT7070_WTL_0442_23Feb07.jpg	MT7070	MCS1	NA	NA		Test hole showing light brown, slightly silty, sandy GRAVEL (angular), tr. cobbles	WTL	2/23/2007
MT7071_WTL_0443_23Feb07.jpg	MT7071	MCS1	NA	NA	NW	View of Qay/Ql exposure in channel	WTL	2/23/2007
MT7071_WTL_0444_23Feb07.jpg	MT7071	MCS1	NA	NA	NW	Overview of Qay/Ql exposure in channel	WTL	2/23/2007
MT7071_WTL_0445_23Feb07.jpg	MT7071	MCS1	NA	NA	NW	Overview of Qay/Ql exposure in channel	WTL	2/23/2007
MT7071_WTL_0446_23Feb07.jpg	MT7071	MCS1	NA	NA	NW	Closeup of Qay/Ql exposure in channel	WTL	2/23/2007
MT7072_WTL_0447_23Feb07.jpg	MT7072	MCS1	NA	NA		Overview of channel bank; Qay overlying Q	WTL	2/23/2007
MT7072_WTL_0448_23Feb07.jpg	MT7072	MCS1	NA	NA		View of channel bank; Qay crust over very loose Qay	WTL	2/23/2007
MT7072_WTL_0449_23Feb07.jpg	MT7072	MCS1	NA	NA		Closeup of channel bank; Qay crust over very loose Qay	WTL	2/23/2007
MT7073_WTL_0451_23Feb07.jpg	MT7073	MCS1	NA	NA	NW	Test hole in Qay/Ql	WTL	2/23/2007
MT7074_WTL_0452_23Feb07.jpg	MT7074	MCS1	NA	NA		Side slope of channel; interbedded Qay/Ql deposit	WTL	2/23/2007
MT7074_WTL_0453_23Feb07.jpg	MT7074	MCS1	NA	NA		Side slope of channel; interbedded Qay/Ql deposit	WTL	2/23/2007
MT7075_WTL_0455_23Feb07.jpg	MT7075	MCS1	NA	NA		Pile of Qay; excellent subballast materia	WTL	2/23/2007
MT7076_WTL_0456_23Feb07.jpg	MT7076	MCS1	NA	NA		Side slope of channel; interbedded Qay/Ql deposit	WTL	2/23/2007
MT7076_WTL_0457_23Feb07.jpg	MT7076	MCS1	NA	NA		Side slope of channel; interbedded Qay/Ql deposit	WTL	2/23/2007
MT7076_WTL_0458_23Feb07.jpg	MT7076	MCS1	NA	NA	NE	View up channel; interbedded Qay/Ql deposit	WTL	2/23/2007
MT7077_WTL_0459_23Feb07.jpg	MT7077	MCS1	NA	NA		Closeup of exposure in old borrow pit; interbedded Qay/Ql deposit	WTL	2/23/2007
MT7077_WTL_0460_23Feb07.jpg	MT7077	MCS1	NA	NA		Exposure in old borrow pit; interbedded Qay/Ql deposit	WTL	2/23/2007
MT7077_WTL_0461_23Feb07.jpg	MT7077	MCS1	NA	NA		Vicinity of exposure in old borrow pit; interbedded Qay/Ql deposi	WTL	2/23/2007
MT7080_WTL_0465_23Feb07.jpg	MT7080	MCS1	NA	NA	E	Test hole in Ql on east bank of borrow pit	WTL	2/23/2007
MT7080_WTL_0466_23Feb07.jpg	MT7080	MCS1	NA	NA		Closeup of Ql with shell fragmen	WTL	2/23/2007
MT7080_WTL_0467_23Feb07.jpg	MT7080	MCS1	NA	NA	E	Closeup of test hole in Ql on east bank of borrow pit	WTL	2/23/2007
MT7081_WTL_0468_23Feb07.jpg	MT7081	MCS1	NA	NA	E	View of whole pit and east bank.	WTL	2/23/2007
MT8001_PHZ_0001_22Feb07.jpg	MT8001	S6	10663+09	204	W	View over eolian sand (Qe)	PHZ	2/22/2007
MT8001_PHZ_0002_22Feb07.jpg	MT8001	S6	10663+09	204	E	View over eolian sand (Qe)	PHZ	2/22/2007
MT8002_PHZ_0003_22Feb07.jpg	MT8002	S6	10667+84	15	E	View over older alluvium (Qao	PHZ	2/22/2007
MT8007_PHZ_0007_22Feb07.jpg	MT8007	S6	10759+83	82	S	View of varnished boulders on older alluvial (Qao) surface	PHZ	2/22/2007
MT8010_PHZ_0009_22Feb07.jpg	MT8010	S6	10823+29	-194	W	On bedrock hill (Ta4), view of boulders and road	PHZ	2/22/2007
MT8010_PHZ_0010_22Feb07.jpg	MT8010	S6	10823+29	-194	E	On bedrock hill (Ta4), view of boulders and road	PHZ	2/22/2007
MT8011_PHZ_0011_22Feb07.jpg	MT8011	S6	10825+52	-144	E	View of basaltic andesite (Ta4) outcrop on slope	PHZ	2/22/2007
MT8012_PHZ_0012_22Feb07.jpg	MT8012	S6	10829+60	58	W	View of basaltic andesite (Ta4) slope	PHZ	2/22/2007
MT8012_PHZ_0013_22Feb07.jpg	MT8012	S6	10829+60	58	N	View of basaltic andesite bedrock (Ta4) slope	PHZ	2/22/2007
MT8012_PHZ_0014_22Feb07.jpg	MT8012	S6	10829+60	58	E	View of bedrock (Ta4) slope	PHZ	2/22/2007
MT8015_PHZ_0017_22Feb07.jpg	MT8015	S6	10864+20	-374	E	View of bedrock (Ta4) slope	PHZ	2/22/2007
MT8016_PHZ_0018_22Feb07.jpg	MT8016	S6	10870+67	-497	W	View of small fans at base of bedrock (Ta4) slope	PHZ	2/22/2007
MT8016_PHZ_0019_22Feb07.jpg	MT8016	S6	10870+67	-497	E	View of bedrock (Ta4) slope, small boulders, and road in background	PHZ	2/22/2007
MT8024_PHZ_0036_23Feb07.jpg	MT8024	S6	11127+68	14	W	View up channel incised into bedrock	PHZ	2/23/2007
MT8025_PHZ_0039_23Feb07.jpg	MT8025	S6	11137+50	51	W	Looking up steep slope towards bedrock cliff and potential rock-fall hazarc	PHZ	2/23/2007
MT8026_PHZ_0040_23Feb07.jpg	MT8026	S6	11144+18	194		Close-up of rock outcrop (lithified lahar deposit	PHZ	2/23/2007
MT8028_PHZ_0042_23Feb07.jpg	MT8028	S6	11176+02	-71	N	View towards outcrop of gabbro (KJm) and slopes. Adjacent to KJm and Qay contact	PHZ	2/23/2007
MT8030_PHZ_0046_23Feb07.jpg	MT8030	S6	11184+97	-443	S	Close-up of gabbro outcrop (KJm)	PHZ	2/23/2007
MT8031_PHZ_0047_23Feb07.jpg	MT8031	S6	11195+28	-124	S	View of test hole and rhyodacite tuff outcrop (Tt3	PHZ	2/23/2007
MT8032_PHZ_0048_23Feb07.jpg	MT8032	S6	11212+22	-351	S	View of dike outcrop	PHZ	2/23/2007
MT8034_PHZ_0049_23Feb07.jpg	MT8034	S6	11231+99	-235	N	View of bedrock (Tt3) outcrop and fan surface	PHZ	2/23/2007
MT8035_PHZ_0051_23Feb07.jpg	MT8035	S6	11245+75	-543	S	View of channel wall - channel incised into bedrock (Tt3	PHZ	2/23/2007
MT8035_PHZ_0052_23Feb07.jpg	MT8035	S6	11245+75	-543	E	View down channel (Qc)	PHZ	2/23/2007
MT8049_PHZ_0076_24Feb07.jpg	MT8049	S6	11378+86	42		Close-up of cut bank along channel exposing earlier channel deposit:	PHZ	2/24/2007
MT8051_PHZ_0078_24Feb07.jpg	MT8051	S6	11403+94	-95	S	View across weathered, rhyolitic tuff bedrock (Tt3) buried by alluvium (Qao	PHZ	2/24/2007

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PHOTO ID	WAYPT	ROUTE	STATION	OFFSET (FEET)	DIRECTION	COMMENT	SOURCE	DATE
MT8052_PHZ_0079_24Feb07.jpg	MT8052	S6	11425+68	-1		View of test hole in grus-covered bedrock (Tt3)	PHZ	2/24/2007
MT8052_PHZ_0080_24Feb07.jpg	MT8052	S6	11425+68	-1	N	View across rhyolitic tuff (Tt3) hills	PHZ	2/24/2007
MT8052_PHZ_0081_24Feb07.jpg	MT8052	S6	11425+68	-1	S	View across rhyolitic tuff (Tt3) hills	PHZ	2/24/2007
MT8054_PHZ_0084_24Feb07.jpg	MT8054	S6	11456+60	-158	E	Close-up of rhyodacite outcrop (Tt3)	PHZ	2/24/2007
MT8054_PHZ_0085_24Feb07.jpg	MT8054	S6	11456+60	-158		View of rhyodacite (Tt3) hill to north of waypoin	PHZ	2/24/2007
MT8055_PHZ_0086_24Feb07.jpg	MT8055	S6	11464+32	-46	N	View of bedrock (Tt3) and alluvium (Qay) between hills	PHZ	2/24/2007
MT8055_PHZ_0087_24Feb07.jpg	MT8055	S6	11464+32	-46	S	Older alluvium (Qao) overlying bedrock (Tt3	PHZ	2/24/2007
MT8057_PHZ_0088_24Feb07.jpg	MT8057	S6	11477+23	-53	N	View of rhyolitic bedrock (Tt3)	PHZ	2/24/2007
MT8069_PHZ_0108_25Feb07.jpg	MT8069	S4	11072+25	5	NE	Looking towards gulley wall and exposure of remnant alluvial fan deposits (QTg	PHZ	2/25/2007
MT8070_PHZ_0110_25Feb07.jpg	MT8070	S5	11272+33	-191		View of incised remnant alluvial fan deposits (QTg	PHZ	2/25/2007
MT8073_PHZ_0115_25Feb07.jpg	MT8073	S5	11318+10	606	E	View of rock outcrop (Tt3)	PHZ	2/25/2007
MT8074_PHZ_0118_25Feb07.jpg	MT8074	S5	11319+24	161		Contact of bedrock (Tt3) and remnant alluvial fan deposits (QTg	PHZ	2/25/2007
MT8075_PHZ_0119_25Feb07.jpg	MT8075	S5	11334+12	-99	N	Looking across rhyolitic tuff hills (Tt3	PHZ	2/25/2007
MT8076_PHZ_0121_25Feb07.jpg	MT8076	S5	11338+07	-48		View of cutbank along channeland exposure of remnant alluvial fan deposits (QTg	PHZ	2/25/2007
MT8078_PHZ_0123_25Feb07.jpg	MT8078	S5	11349+65	-65		View of tuff (Tt3) and varnished alluvial cove	PHZ	2/25/2007
MT8079_PHZ_0125_25Feb07.jpg	MT8079	S4	11162+56	121		Close-up of chert	PHZ	2/25/2007
MT8081_PHZ_0126_25Feb07.jpg	MT8081	S5	11363+32	-26		View of test hole in younger alluvium (Qay	PHZ	2/25/2007
MT8087_PHZ_0131_26Feb07.jpg	MT8087	S4	10856+30	-16	E	View of test hole in remnant alluvial fan deposits (QTg) veneered by eolian san	PHZ	2/26/2007
MT8088_PHZ_0133_26Feb07.jpg	MT8088	S4	10864+03	-2	W	View of test hole in eolian sand over remnant alluvial fan (QTg	PHZ	2/26/2007
MT8092_PHZ_0137_26Feb07.jpg	MT8092	S4	10905+00	-63	N	View of test hole in remnant alluvial fan deposit (QTg) covered by veneer of eolian sand	PHZ	2/26/2007
MT8094_PHZ_0140_26Feb07.jpg	MT8094	S4	10931+48	84	W	View of test hole in eolian sand over remnant alluvial fan deposits (QTg	PHZ	2/26/2007
MT8096_PHZ_0143_26Feb07.jpg	MT8096	S4	10958+51	44	E	View of test hole in eolian sand	PHZ	2/26/2007
MT8100_PHZ_0149_26Feb07.jpg	MT8100	S5	11195+05	48		View of test hole in eolian sand (Qe)	PHZ	2/26/2007
MT8101_PHZ_0150_26Feb07.jpg	MT8101	S5	11184+70	-14	N	View of test hole in channel wall	PHZ	2/26/2007
MT8104_PHZ_0154_26Feb07.jpg	MT8104	S5	11139+29	-33	N	Looking at remnant alluvial fan (QTg) exposure in channe	PHZ	2/26/2007
MT8109_PHZ_0159_26Feb07.jpg	MT8109	S5	11090+33	-17		View of test hole in younger alluvium (Qay	PHZ	2/26/2007
MT8110_PHZ_0161_26Feb07.jpg	MT8110	S5	11078+05	23	NE	View of test hole in younger fan deposits (Qay)	PHZ	2/26/2007
MT8111_PHZ_0163_26Feb07.jpg	MT8111	S5	11069+17	49		Close-up of alluvium (Qay) exposed in channel wal	PHZ	2/26/2007
MT8114_PHZ_0166_26Feb07.jpg	MT8114	S5	11024+56	-7		View of test hole and CaCO3 accumulation on underside of rock	PHZ	2/26/2007
MT8115_PHZ_0168_26Feb07.jpg	MT8115	S5	11019+10	-4	E	View of test hole in older alluvium (Qao	PHZ	2/26/2007
MT8118_PHZ_0172_26Feb07.jpg	MT8118	S5	10989+58	-35		View of test hole in older alluvium (Qao	PHZ	2/26/2007
MT8119_PHZ_0174_27Feb07.jpg	MT8119	S4	10849+39	338	S	View of test hole in eolian sand over remnant alluvial fan (QTg	PHZ	2/27/2007
MT8120_PHZ_0176_27Feb07.jpg	MT8120	S4	10838+96	463	S	View of test hole	PHZ	2/27/2007
MT8121_PHZ_0178_27Feb07.jpg	MT8121	S4	10837+44	386	W	View of bedrock outcrop (Ta4)	PHZ	2/27/2007
MT8122_PHZ_0179_27Feb07.jpg	MT8122	S4	10835+98	52		View of test hole in alluvium (Qay	PHZ	2/27/2007
MT8122_PHZ_0180_27Feb07.jpg	MT8122	S4	10835+98	52	W	View along contact of alluvium (Qay) and bedrock (Ta4	PHZ	2/27/2007
MT8123_PHZ_0181_27Feb07.jpg	MT8123	S4	10834+71	-235		Test hole and view of alluvial surface (Qay	PHZ	2/27/2007
MT8124_PHZ_0182_27Feb07.jpg	MT8124	S4	10827+48	-137	W	Looking down channel incised into alluvium (Qay	PHZ	2/27/2007
MT8124_PHZ_0183_27Feb07.jpg	MT8124	S4	10827+48	-137		View of quarried area	PHZ	2/27/2007
MT8124_PHZ_0184_27Feb07.jpg	MT8124	S4	10827+48	-137		View of cut slope along road/channel	PHZ	2/27/2007
MT8126_PHZ_0187_27Feb07.jpg	MT8126	S4	10823+29	-561	E	View of sheared bedron (Ta4)	PHZ	2/27/2007
MT8127_PHZ_0188_27Feb07.jpg	MT8127	S4	10812+88	-293		View of test holein remnant alluvial fan deposits (QTg	PHZ	2/27/2007
MT8130_PHZ_0194_27Feb07.jpg	MT8130	S4	10800+22	-108	N	View up channel	PHZ	2/27/2007
MT8131_PHZ_0195_27Feb07.jpg	MT8131	S4	10772+41	0		View of test pit in alluvium (Qay	PHZ	2/27/2007
MT8134_PHZ_0199_27Feb07.jpg	MT8134	S4	10680+13	630		View of test hole	PHZ	2/27/2007
MT8135_PHZ_0201_27Feb07.jpg	MT8135	S4	10683+34	2	E	View of test hole	PHZ	2/27/2007
MT8136_PHZ_0202_27Feb07.jpg	MT8136	S4	10689+14	-1019		View of test hole	PHZ	2/27/2007
MT8137_PHZ_0204_27Feb07.jpg	MT8137	S4	10724+10	-679		View of test hole	PHZ	2/27/2007
MT8147_PHZ_0224_01Mar07.jpg	MT8147	S6	11813+96	-28	N	View down channel showing exposed basin fill (Qbf	PHZ	3/1/2007

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PHOTO ID	WAYPT	ROUTE	STATION	OFFSET (FEET)	DIRECTION	COMMENT	SOURCE	DATE
MT8148_PHZ_0225_01Mar07.jpg	MT8148	S6	11787+15	-126		Test hole in eolian sand (Qe over basin fill deposits (Qbf	PHZ	3/1/2007
MT8150_PHZ_0231_01Mar07.jpg	MT8150	S6	11745+70	49	N	Test hole in eolian sand (Qe) over basin fill (Qbf	PHZ	3/1/2007
MT8151_PHZ_0233_01Mar07.jpg	MT8151	S6	11721+41	-483		Test hole in older alluvium (Qao) exposed between dunes	PHZ	3/1/2007
MT8154_PHZ_0241_01Mar07.jpg	MT8154	S6	11842+32	-173	N	Test hole in basin fill	PHZ	3/1/2007
MT8155_PHZ_0244_01Mar07.jpg	MT8155	S4	11705+71	93		Channel wall with exposed basin fill deposits (Qbf	PHZ	3/1/2007
MT8156_PHZ_0247_01Mar07.jpg	MT8156	S6	11909+43	-24		Test hole in surface of old railroad grade fil	PHZ	3/1/2007
MT8158_PHZ_0251_01Mar07.jpg	MT8158	S6	11953+23	-69		Test hole in basin fill deposits (Qbf)	PHZ	3/1/2007
MT8159_PHZ_0254_01Mar07.jpg	MT8159	S4	11806+69	16		Test hole in basin fill (Qbf	PHZ	3/1/2007
MT8161_PHZ_0259_02Mar07.jpg	MT8161	S5	11526+88	-73	N	View of road cut and exposure of remnant alluvial fan (QTg	PHZ	3/2/2007
MT8162_PHZ_0261_02Mar07.jpg	MT8162	S4	11316+55	68		Test hole in remnant alluvial fan surface (QTg	PHZ	3/2/2007
MT8162_PHZ_0262_02Mar07.jpg	MT8162	S4	11316+55	68	W	View over remnant alluvial fan (QTg) ridge:	PHZ	3/2/2007
MT8164_PHZ_0265_02Mar07.jpg	MT8164	S4	11289+42	392		Closeup of desert pavement on remnant alluvial fan surface (QTg	PHZ	3/2/2007
MT8165_PHZ_0267_02Mar07.jpg	MT8165	S4	11273+70	230		View of remnant alluvial fan deposits (QTg) in channel cut exposur	PHZ	3/2/2007
MT8165_PHZ_0268_02Mar07.jpg	MT8165	S4	11273+70	230		View of remnant alluvial fan (QTg) deposits in channel cut exposur	PHZ	3/2/2007
MT8166_PHZ_0270_02Mar07.jpg	MT8166	S4	11268+95	186		Test hole in older alluvium (Qao	PHZ	3/2/2007
MT8167_PHZ_0272_02Mar07.jpg	MT8167	S4	11253+56	26		View of stream cut exposing earlier channel deposits	PHZ	3/2/2007
MT8169_PHZ_0275_02Mar07.jpg	MT8169	S4	11232+48	234		Test hole in younger alluvial fan surface (Qay	PHZ	3/2/2007
MT8171_PHZ_0279_02Mar07.jpg	MT8171	S5	11545+61	148		Test hole in younger alluvium (Qay	PHZ	3/2/2007
MT8173_PHZ_0283_02Mar07.jpg	MT8173	S5	11582+53	-25	E	Test hole in younger alluvium (Qay	PHZ	3/2/2007
MT8175_PHZ_0285_02Mar07.jpg	MT8175	S5	11599+75	19		Test hole in older alluvium (Qao	PHZ	3/2/2007
MT8178_PHZ_0288_02Mar07.jpg	MT8178	S6	11596+86	-158		Test hole in surface of lacustrine strandline and view of rounded pebbles (in shovel	PHZ	3/2/2007
MT8178_PHZ_0289_02Mar07.jpg	MT8178	S6	11596+86	-158	SE	View over lacustrine strandline (Ql)	PHZ	3/2/2007
MT8179_PHZ_0290_02Mar07.jpg	MT8179	S6	11562+83	151	N	View of exposure of carbonate-cemented beach sand in lacustrine strandline (Ql	PHZ	3/2/2007
MT8179_PHZ_0291_02Mar07.jpg	MT8179	S6	11562+83	151		Exposure of lacustrine deposits in lacustrine strandline	PHZ	3/2/2007
MT8181_PHZ_0294_03Mar07.jpg	MT8181	S5	10929+57	21		Test hole in older alluvium (Qao	PHZ	3/3/2007
MT8181_PHZ_0297_03Mar07.jpg	MT8181	S5	10929+57	21	N	Closeup of bedrock (Tt3) outcrop	PHZ	3/3/2007
MT8184_PHZ_0300_03Mar07.jpg	MT8184	S5	10961+22	606	NW	View of bedrock (Tt3) hill	PHZ	3/3/2007
MT8187_PHZ_0305_03Mar07.jpg	MT8187	S5	10899+38	249	NW	View of rhyolitic bedrock (Tt3) hill	PHZ	3/3/2007
MT8187_PHZ_0306_03Mar07.jpg	MT8187	S5	10899+38	249		Closeup of rhyolitic (Tt3) outcrop	PHZ	3/3/2007
MT8188_PHZ_0307_03Mar07.jpg	MT8188	S5	10891+69	214		View of younger alluvium (Qay) and bedrock knot	PHZ	3/3/2007
MT8189_PHZ_0308_03Mar07.jpg	MT8189	S5	10883+68	186		Test hole in older alluvium (Qao	PHZ	3/3/2007
MT8190_PHZ_0311_03Mar07.jpg	MT8190	S6	10927+48	150	E	Closeup of bedrock surface (Ta4)	PHZ	3/3/2007
MT8190_PHZ_0312_03Mar07.jpg	MT8190	S6	10927+48	150	N	View of channel incised into bedrock (Ta4)	PHZ	3/3/2007
MT8191_PHZ_0315_03Mar07.jpg	MT8191	S6	11029+56	-56	N	Closeup of outcrop of rhyolitic tuff (Tt3	PHZ	3/3/2007
MT8192_PHZ_0316_03Mar07.jpg	MT8192	S6	11023+80	-260	N	View over lacustrine deposits (Ql)	PHZ	3/3/2007
MT8192_PHZ_0317_03Mar07.jpg	MT8192	S6	11023+80	-260	N	View of younger alluvium (Qay) over lacustrine deposits (Ql) in channel wal	PHZ	3/3/2007
MT8193_PHZ_0318_03Mar07.jpg	MT8193	S6	11016+12	-83	NE	Closeup of rhyodacitic rock outcrop (Tt3)	PHZ	3/3/2007
MT8194_PHZ_0319_03Mar07.jpg	MT8194	S6	11007+47	-84	S	View over bedrock (Tt3) towards younger alluvial surface (Qay)	PHZ	3/3/2007
MT8194_PHZ_0320_03Mar07.jpg	MT8194	S6	11007+47	-84	N	View over bedrock (Tt3) slope	PHZ	3/3/2007
MT8195_PHZ_0321_03Mar07.jpg	MT8195	S6	10998+52	16		Test hole in older alluvium (Qao	PHZ	3/3/2007
MT8197_PHZ_0325_04Mar07.jpg	MT8197	S6	10361+42	104	N	Closeup of bedrock (Ta4) outcrop	PHZ	3/4/2007
MT8197_PHZ_0327_04Mar07.jpg	MT8197	S6	10361+42	104	E	View along alignment and boulder-strewn hillside of basaltic andesite (Ta4	PHZ	3/4/2007
MT8198_PHZ_0328_04Mar07.jpg	MT8198	S6	10372+96	47		Test hole in younger alluvium (Qay	PHZ	3/4/2007
MT8198_PHZ_0329_04Mar07.jpg	MT8198	S6	10372+96	47		View of canyon incised into bedrock (Ta4)	PHZ	3/4/2007
MT8200_PHZ_0332_04Mar07.jpg	MT8200	S6	10385+73	187	N	View up channel	PHZ	3/4/2007
MT8200_PHZ_0333_04Mar07.jpg	MT8200	S6	10385+73	187	N	View up channel incised into bedrock	PHZ	3/4/2007
MT8201_PHZ_0334_04Mar07.jpg	MT8201	S6	10397+21	116		Test hole in older alluvium (Qao	PHZ	3/4/2007
MT8202_PHZ_0337_04Mar07.jpg	MT8202	S6	10425+00	93	E	Test hole in younger alluvium (Qay	PHZ	3/4/2007
MT8203_PHZ_0340_04Mar07.jpg	MT8203	S6	10439+69	150		Test hole in younger alluvium (Qay	PHZ	3/4/2007
MT8204_PHZ_0342_04Mar07.jpg	MT8204	S5	10335+77	-84	N	Test hole in younger alluvium (Qay	PHZ	3/4/2007

TABLE C-1
LOG OF PHOTOGRAPHS

PHOTO ID	WAYPT	ROUTE	STATION	OFFSET (FEET)	DIRECTION	COMMENT	SOURCE	DATE
MT8205_PHZ_0345_04Mar07.jpg	MT8205	S6	10318+35	45		Test hole in younger alluvium (Qay	PHZ	3/4/2007
MT8206_PHZ_0347_04Mar07.jpg	MT8206	S5	10305+71	-36		Closeup of basaltic andesite (Ta4) boulders	PHZ	3/4/2007
MT8206_PHZ_0348_04Mar07.jpg	MT8206	S5	10305+71	-36	W	View over bedrock (Ta4) slope	PHZ	3/4/2007
MT8207_PHZ_0349_04Mar07.jpg	MT8207	S6	10289+83	155	E	View over bedrock (Ta4)	PHZ	3/4/2007
MT8208_PHZ_0351_04Mar07.jpg	MT8208	S5	10272+53	-219		Test hole in younger alluvium (Qay	PHZ	3/4/2007
MT8209_PHZ_0354_04Mar07.jpg	MT8209	S5	10257+18	83		Test hole in younger alluvium (Qay	PHZ	3/4/2007
MT8210_PHZ_0356_04Mar07.jpg	MT8210	S5	10199+76	122		Test hole in surface of Tertiary sedimentary rocks (Tsy) veneered by older alluvium	PHZ	3/4/2007
MT8211_PHZ_0359_04Mar07.jpg	MT8211	S5	10189+70	94	E	View across channel incised into Tertiary sedimentary rocks (Tsy	PHZ	3/4/2007
MT8211_PHZ_0360_04Mar07.jpg	MT8211	S5	10189+70	94		Closeup of Tertiary sedimentary rock (Tsy) outcrop (sandstone	PHZ	3/4/2007
MT8212_PHZ_0361_05Mar07.jpg	MT8212	S6	10615+87	-73		Test hole in colluvial cover cover that buries Ta4	PHZ	3/5/2007
MT8213_PHZ_0364_05Mar07.jpg	MT8213	S6	10610+09	-536		Closeup of bedrock (Ta4) outcrop	PHZ	3/5/2007
MT8213_PHZ_0365_05Mar07.jpg	MT8213	S6	10610+09	-536	E	View over alignment	PHZ	3/5/2007
MT8214_PHZ_0366_05Mar07.jpg	MT8214	S6	10595+92	-34		Test hole in colluvial cover cover that buries Ta4	PHZ	3/5/2007
MT8215_PHZ_0369_05Mar07.jpg	MT8215	S6	10584+79	88		Test hole in eolian sand deposit (Qe)	PHZ	3/5/2007
MT8217_PHZ_0372_05Mar07.jpg	MT8217	S6	10532+08	153	NW	View over bedrock exposure (Ta4)	PHZ	3/5/2007
MT8220_PHZ_0378_05Mar07.jpg	MT8220	S6	10503+39	-31	W	View of Ta4 outcrop - quartz vein is light colored rock	PHZ	3/5/2007
MT8220_PHZ_0379_05Mar07.jpg	MT8220	S6	10503+39	-31	SE	View over bedrock (Ta4) and colluvial cover	PHZ	3/5/2007
MT8221_PHZ_0380_05Mar07.jpg	MT8221	S6	10485+65	-146		Test hole in younger alluvium (Qay	PHZ	3/5/2007
MT8222_PHZ_0383_05Mar07.jpg	MT8222	S6	10568+22	-217		Test hole in eolian sand	PHZ	3/5/2007
MT8223_PHZ_0385_05Mar07.jpg	MT8223	S6	10594+13	576		Test hole in colluvium-covered bedrock (Ta4	PHZ	3/5/2007
MT8223_PHZ_0387_05Mar07.jpg	MT8223	S6	10594+13	576	E	View over surface of colluvium-covered bedrock (Ta4	PHZ	3/5/2007
MT8224_PHZ_0388_05Mar07.jpg	MT8224	S5	10604+31	22		Test hole in colluvial cover over bedrock (Ta4)	PHZ	3/5/2007
MT8224_PHZ_0389_05Mar07.jpg	MT8224	S5	10604+31	22	N	View over saddle of bedrock (Ta4)	PHZ	3/5/2007
MT8225_PHZ_0390_05Mar07.jpg	MT8225	S6	10623+37	327		Closeup of bedrock (Ta4)	PHZ	3/5/2007
MT8226_PHZ_0393_05Mar07.jpg	MT8226	S6	10651+20	-429		Test hole in basin fill (Qbf	PHZ	3/5/2007
MT8227_PHZ_0395_05Mar07.jpg	MT8227	S6	10949+86	118	N	Closeup of younger alluvium (Qay) outcrop (lake beds in lower right	PHZ	3/5/2007
MT8228_PHZ_0398_06Mar07.jpg	MT8228	S6	11275+45	72	NW	Closeup of rhyolitic rock (Tt3)	PHZ	3/6/2007
MT8228_PHZ_0400_06Mar07.jpg	MT8228	S6	11275+45	72		Closeup of younger alluvium (Qay) in channel wal	PHZ	3/6/2007
MT8229_PHZ_0401_06Mar07.jpg	MT8229	S6	11286+50	-142		Test hole in older alluvium (Qao	PHZ	3/6/2007
MT8229_PHZ_0402_06Mar07.jpg	MT8229	S6	11286+50	-142	NE	View over rhyolitic tuff (Tt3) hill:	PHZ	3/6/2007
MT8231_PHZ_0405_06Mar07.jpg	MT8231	S6	11306+20	384		Test hole in younger alluvium (Qay	PHZ	3/6/2007
MT8234_PHZ_0412_06Mar07.jpg	MT8234	S6	11251+03	-10		Closeup of rhyolitic rock (Tt3) outcrop	PHZ	3/6/2007
MT8234_PHZ_0413_06Mar07.jpg	MT8234	S6	11251+03	-10	N	View over rhyolitic rock (Tt3) exposure	PHZ	3/6/2007
MT8234_PHZ_0414_06Mar07.jpg	MT8234	S6	11251+03	-10	SW	View into bedrock (Tt3) incised by rills emanating from rangefron	PHZ	3/6/2007
MT8235_PHZ_0415_06Mar07.jpg	MT8235	S6	11179+93	152		Closeup of gabbro (KJm) outcrop	PHZ	3/6/2007
MT8236_PHZ_0418_06Mar07.jpg	MT8236	S6	11180+21	2		Test hole in younger alluvium (Qay	PHZ	3/6/2007
MT8238_PHZ_0421_06Mar07.jpg	MT8238	S6	11100+07	23		Closeup of bedrock (Tt3) outcrop	PHZ	3/6/2007
MT8240_PHZ_0424_06Mar07.jpg	MT8240	S6	11094+08	43		Test hole in lacustrine deposits (Ql)	PHZ	3/6/2007
MT8240_PHZ_0425_06Mar07.jpg	MT8240	S6	11094+08	43	NW	View over lacustrine deposits	PHZ	3/6/2007
MT8241_PHZ_0426_06Mar07.jpg	MT8241	S6	11089+86	38	NW	View up talus slope at bedrock (Tt3) outcrop	PHZ	3/6/2007
MT8242_PHZ_0428_06Mar07.jpg	MT8242	S6	11077+55	116	N	View up rill along contact of rhyolitic tuff (Tt3) and volcaniclastic conglomerat	PHZ	3/6/2007
MT8243_PHZ_0431_06Mar07.jpg	MT8243	S6	11068+74	68	NW	View over rhyolitic tuff (Tt3) hill:	PHZ	3/6/2007
MT8244_PHZ_0432_06Mar07.jpg	MT8244	S6	11095+90	-1108		View of tufa and wave cut bench	PHZ	3/6/2007
MT8244_PHZ_0433_06Mar07.jpg	MT8244	S6	11095+90	-1108		Closeup of tufa boulders	PHZ	3/6/2007
MT8245_PHZ_0434_06Mar07.jpg	MT8245	S6	11105+62	-169	S	View along debris apron	PHZ	3/6/2007

NOTES:

1. Station and offset are not shown for those waypoints that are not adjacent to an alignment segment
2. Positive (+) offset is right of the alignment when looking in the direction of increasing station.

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
SPECIAL INSTRUCTION SHEET

1. QA: N/A

This is a placeholder page for records that cannot be scanned.

2. Record Date 07/25/2007	3. Accession Number ATTN to: ENG.20070910.0023
4. Author Name(s) N/A	5. Authorization Organization Shannon & Wilson
6. Title/Description Construction Aggregate Report Mina Rail Corridor, APPENDIX C: Photographs	
7. Document Number(s) V0-CY05-NHC4-00197-00025-001	8. Version Designator 004
9. Document Type Media DATA	10. Medium 2 CD's
11. Access Control Code N/A	
12. Traceability Designator V0-CY05-NHC4-00197-00025-001-004	

13. Comments

CD's: 1 Original & 1 copy

Validation of complete file transferred. All files copied. Software used: Corel Photo-Paint 8.0

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14. RPC Electronic Media Verification

XREF MOL.20070918.0422

SEP 21 2007 TChurch /BSC-BS

MD5 Validation

Att: ENG.20070910.0023

dir.txt

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Volume Serial Number is F5B9-C2DF

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               0 File(s)              0 bytes

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01/05/2007	11:22a	782,335	MT1068A_SMP_0117_11Oct06.jpg
01/16/2007	03:10p	720,891	MT1068_ALG_0201_11Oct06.jpg
01/16/2007	03:10p	777,260	MT1068_ALG_0202_11Oct06.jpg
01/16/2007	03:10p	1,185,467	MT1068_ALG_0203_11Oct06.jpg
01/16/2007	03:10p	747,909	MT1068_ALG_0204_11Oct06.jpg
01/05/2007	11:22a	670,435	MT1068_SMP_0118_11Oct06.jpg
01/16/2007	03:09p	691,020	MT1070_ALG_0210_11Oct06.jpg
01/05/2007	11:23a	975,636	MT1070_SMP_0121_11Oct06.jpg
01/16/2007	03:10p	721,222	MT1071_ALG_0215_12Oct06.jpg
01/05/2007	11:23a	996,983	MT1071_SMP_0122_12Oct06.jpg
01/16/2007	03:10p	780,277	MT1072_ALG_0217_12Oct06.jpg
01/16/2007	03:10p	701,425	MT1074A_ALG_0220_12Oct06.jpg
01/16/2007	03:10p	698,863	MT1074A_ALG_0221_12Oct06.jpg
01/05/2007	11:24a	811,661	MT1074A_SMP_0126_12Oct06.jpg
01/05/2007	11:24a	793,921	MT1074A_SMP_0127_12Oct06.jpg
01/16/2007	03:10p	547,401	MT1074B_ALG_0227_12Oct06.jpg
01/16/2007	03:10p	771,020	MT1074B_ALG_0229_12Oct06.jpg
01/16/2007	03:10p	739,343	MT1074B_ALG_0230_12Oct06.jpg
01/16/2007	03:10p	659,208	MT1076_ALG_0235_12Oct06.jpg
01/05/2007	11:25a	802,616	MT1076_SMP_0133_12Oct06.jpg

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01/16/2007	03:10p	750,400	MT1078_ALG_0243_12Oct06.jpg
01/16/2007	03:10p	713,311	MT1078_ALG_0244_12Oct06.jpg
01/16/2007	03:10p	705,236	MT1078_ALG_0245_12Oct06.jpg
01/16/2007	03:10p	789,192	MT1078_ALG_0246_12Oct06.jpg
01/16/2007	03:10p	774,063	MT1078_ALG_0247_12Oct06.jpg
01/05/2007	11:25a	716,574	MT1078_SMP_0135_12Oct06.jpg
01/05/2007	11:25a	623,604	MT1078_SMP_0136_12Oct06.jpg
01/05/2007	11:25a	673,405	MT1078_SMP_0137_12Oct06.jpg
01/16/2007	03:10p	761,533	MT1079_ALG_0248_13Oct06.jpg
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01/16/2007	03:10p	803,447	MT1081_ALG_0256_13Oct06.jpg
01/05/2007	11:26a	897,438	MT1081_SMP_0147_13Oct06.jpg
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01/16/2007	03:10p	743,833	MT1082B_ALG_0260_13Oct06.jpg
01/05/2007	11:26a	599,231	MT1082B_SMP_0151_13Oct06.jpg
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01/05/2007	11:26a	767,123	MT1082_SMP_0148_13Oct06.jpg
01/05/2007	11:26a	715,155	MT1082_SMP_0149_13Oct06.jpg
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10/05/2006	03:02p	1,269,056	MT2001_EAK_0002_05Oct06.jpg
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10/07/2006	08:46a	305,473	MT2018_WTL_0092_07Oct06.jpg
10/07/2006	08:51a	327,486	MT2018_WTL_0094_07Oct06.jpg
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10/06/2006	03:50p	317,084	MT3024_WTL_0083_06Oct06.jpg
10/06/2006	03:51p	323,693	MT3024_WTL_0084_06Oct06.jpg
10/06/2006	03:51p	313,460	MT3024_WTL_0085_06Oct06.jpg
11/16/2006	09:04a	359,882	MT3025_WTL_0330_16Nov06.jpg
11/16/2006	09:04a	381,181	MT3025_WTL_0331_16Nov06.jpg
11/16/2006	09:05a	389,153	MT3025_WTL_0332_16Nov06.jpg
11/16/2006	09:05a	311,909	MT3025_WTL_0333_16Nov06.jpg
01/15/2007	01:21p	276,756	MT3026_WTL_0196_09Oct06.jpg
10/09/2006	10:33a	309,269	MT3027_WTL_0197_09Oct06.jpg
10/09/2006	10:33a	309,318	MT3027_WTL_0198_09Oct06.jpg
10/09/2006	11:19a	297,321	MT3029_WTL_0200_09Oct06.jpg
10/09/2006	11:19a	293,627	MT3029_WTL_0201_09Oct06.jpg
10/09/2006	11:46a	307,241	MT3030_WTL_0202_09Oct06.jpg
10/09/2006	11:58a	296,496	MT3031_WTL_0203_09Oct06.jpg
10/09/2006	11:58a	319,543	MT3031_WTL_0204_09Oct06.jpg
10/09/2006	12:21p	310,030	MT3032_WTL_0207_09Oct06.jpg
10/09/2006	12:48p	295,766	MT3034_WTL_0208_09Oct06.jpg
10/09/2006	01:10p	331,118	MT3036_WTL_0209_09Oct06.jpg
10/09/2006	01:27p	330,340	MT3037_WTL_0211_09Oct06.jpg
10/09/2006	01:46p	342,304	MT3038_WTL_0212_09Oct06.jpg
10/09/2006	01:58p	311,767	MT3038_WTL_0213_09Oct06.jpg
10/09/2006	02:19p	292,221	MT3039_WTL_0215_09Oct06.jpg
10/09/2006	02:38p	304,571	MT3040_WTL_0216_09Oct06.jpg
10/09/2006	02:54p	314,848	MT3041_WTL_0217_09Oct06.jpg
10/09/2006	03:17p	298,579	MT3042_WTL_0220_09Oct06.jpg
10/09/2006	03:25p	296,991	MT3043_WTL_0221_09Oct06.jpg
10/09/2006	03:46p	291,422	MT3044_WTL_0222_09Oct06.jpg

10/09/2006	05:07p	294,374	MT3045_WTL_0223_09Oct06.jpg
01/15/2007	01:24p	271,363	MT3045_WTL_0224_09Oct06.jpg
10/09/2006	05:09p	298,466	MT3045_WTL_0225_09Oct06.jpg
10/09/2006	05:56p	332,354	MT3046_WTL_0227_09Oct06.jpg
01/15/2007	01:25p	295,475	MT3046_WTL_0228_09Oct06.jpg
10/10/2006	10:04a	302,228	MT3047_WTL_0232_10Oct06.jpg
10/10/2006	10:40a	333,416	MT3048_WTL_0233_10Oct06.jpg
10/10/2006	10:55a	346,196	MT3049_WTL_0234_10Oct06.jpg
10/10/2006	10:56a	308,042	MT3049_WTL_0235_10Oct06.jpg
10/10/2006	11:24a	318,954	MT3050_WTL_0240_10Oct06.jpg
10/10/2006	11:35a	319,464	MT3051_WTL_0242_10Oct06.jpg
10/10/2006	11:40a	298,715	MT3051_WTL_0243_10Oct06.jpg
10/10/2006	11:46a	306,746	MT3052_WTL_0244_10Oct06.jpg
10/10/2006	11:51a	341,454	MT3052_WTL_0245_10Oct06.jpg
10/10/2006	12:33p	340,290	MT3054_WTL_0247_10Oct06.jpg
10/10/2006	01:07p	324,498	MT3054_WTL_0248_10Oct06.jpg
10/10/2006	01:07p	366,286	MT3056_WTL_0249_10Oct06.jpg
10/10/2006	01:30p	328,995	MT3056_WTL_0250_10Oct06.jpg
10/10/2006	01:30p	339,516	MT3056_WTL_0251_10Oct06.jpg
10/10/2006	02:39p	316,890	MT3058_WTL_0254_10Oct06.jpg
10/10/2006	02:39p	324,714	MT3058_WTL_0255_10Oct06.jpg
10/10/2006	02:45p	337,909	MT3058_WTL_0257_10Oct06.jpg
10/10/2006	03:40p	320,190	MT3060_WTL_0258_10Oct06.jpg
10/10/2006	03:40p	317,859	MT3060_WTL_0259_10Oct06.jpg
10/10/2006	03:40p	315,232	MT3060_WTL_0260_10Oct06.jpg
10/29/2006	05:25a	1,503,521	MT4001_BKR_0152_28Oct06.jpg
10/29/2006	05:25a	1,393,630	MT4001_BKR_0153_28Oct06.jpg
10/29/2006	05:25a	1,446,269	MT4002_BKR_0154_28Oct06.jpg
10/29/2006	05:25a	1,391,906	MT4003_BKR_0155_28Oct06.jpg
10/29/2006	05:25a	1,520,153	MT4003_BKR_0156_28Oct06.jpg
10/29/2006	05:25a	1,431,126	MT4004_BKR_0157_28Oct06.jpg
10/29/2006	05:25a	1,394,929	MT4005_BKR_0158_28Oct06.jpg
10/29/2006	05:25a	1,409,390	MT4005_BKR_0159_28Oct06.jpg
10/29/2006	05:25a	1,458,231	MT4006_BKR_0161_28Oct06.jpg
10/29/2006	05:25a	1,503,117	MT4006_BKR_0162_28Oct06.jpg
10/31/2006	05:01a	1,396,098	MT4007_BKR_0164_28Oct06.jpg
10/31/2006	05:02a	1,500,704	MT4007_BKR_0165_28Oct06.jpg
10/31/2006	05:02a	1,447,362	MT4007_BKR_0166_28Oct06.jpg
11/02/2006	07:45a	1,521,016	MT4008_BKR_0167_31Oct06.jpg
11/02/2006	07:45a	1,493,423	MT4008_BKR_0168_31Oct06.jpg
11/02/2006	07:45a	1,493,114	MT4008_BKR_0170_31Oct06.jpg
11/02/2006	07:45a	1,492,721	MT4008_BKR_0171_31Oct06.jpg
11/02/2006	07:45a	1,519,203	MT4008_BKR_0172_31Oct06.jpg
11/02/2006	07:45a	1,448,358	MT4008_BKR_0173_31Oct06.jpg
11/02/2006	07:45a	1,425,284	MT4008_BKR_0174_31Oct06.jpg
11/02/2006	07:45a	1,421,655	MT4008_BKR_0175_31Oct06.jpg
11/02/2006	07:45a	1,535,210	MT4008_BKR_0176_31Oct06.jpg
11/04/2006	06:17a	1,419,278	MT4009_BKR_0177_02Nov06.jpg
11/04/2006	06:17a	1,502,680	MT4009_BKR_0178_02Nov06.jpg
11/04/2006	06:17a	1,405,508	MT4009_BKR_0179_02Nov06.jpg
11/04/2006	06:17a	1,352,783	MT4009_BKR_0180_02Nov06.jpg
11/04/2006	06:17a	1,424,774	MT4009_BKR_0182_02Nov06.jpg
11/04/2006	06:17a	1,496,187	MT4009_BKR_0183_02Nov06.jpg
11/04/2006	06:14a	1,454,973	MT4010_BKR_0184_03Nov06.jpg
11/04/2006	06:14a	1,508,837	MT4010_BKR_0185_03Nov06.jpg
11/04/2006	06:14a	1,409,347	MT4010_BKR_0186_03Nov06.jpg
11/04/2006	06:14a	1,494,862	MT4010_BKR_0187_03Nov06.jpg
11/04/2006	06:15a	1,448,596	MT4010_BKR_0188_03Nov06.jpg
11/14/2006	10:13a	325,440	MT5006_WTL_0271_14Nov06.jpg
11/14/2006	10:33a	332,780	MT5007_WTL_0272_14Nov06.jpg
11/14/2006	10:33a	333,299	MT5007_WTL_0273_14Nov06.jpg
11/14/2006	02:34p	328,065	MT5010_WTL_0281_14Nov06.jpg
11/14/2006	02:35p	320,983	MT5010_WTL_0282_14Nov06.jpg

11/14/2006	02:52p	316,450	MT5010_WTL_0283_14Nov06.jpg
11/14/2006	02:52p	305,548	MT5010_WTL_0284_14Nov06.jpg
11/14/2006	02:53p	322,636	MT5010_WTL_0285_14Nov06.jpg
11/14/2006	03:42p	316,566	MT5013_WTL_0291_14Nov06.jpg
11/15/2006	09:10a	360,911	MT5017_WTL_0303_15Nov06.jpg
11/15/2006	09:10a	298,499	MT5017_WTL_0304_15Nov06.jpg
11/15/2006	09:12a	321,222	MT5017_WTL_0305_15Nov06.jpg
11/15/2006	02:21p	327,653	MT5020_WTL_0314_15Nov06.jpg
11/15/2006	02:21p	303,874	MT5020_WTL_0315_15Nov06.jpg
11/15/2006	02:28p	304,185	MT5020_WTL_0316_15Nov06.jpg
11/15/2006	02:33p	331,324	MT5020_WTL_0317_15Nov06.jpg
11/15/2006	04:02p	314,799	MT5021_WTL_0318_15Nov06.jpg
11/15/2006	04:06p	306,748	MT5021_WTL_0319_15Nov06.jpg
11/15/2006	04:23p	322,436	MT5021_WTL_0320_15Nov06.jpg
11/15/2006	05:33p	293,131	MT5023_WTL_0326_15Nov06.jpg
11/15/2006	05:33p	344,535	MT5023_WTL_0327_15Nov06.jpg
11/15/2006	05:41p	304,710	MT5023_WTL_0328_15Nov06.jpg
11/15/2006	05:41p	304,830	MT5023_WTL_0329_15Nov06.jpg
11/16/2006	11:43a	354,982	MT5023_WTL_0336_16Nov06.jpg
02/18/2007	04:02p	328,555	MT7001_WTL_0361_18Feb07.jpg
02/18/2007	04:02p	334,091	MT7001_WTL_0362_18Feb07.jpg
02/18/2007	05:29p	297,661	MT7003_WTL_0365_18Feb07.jpg
02/18/2007	05:30p	312,644	MT7003_WTL_0366_18Feb07.jpg
02/18/2007	06:02p	329,144	MT7005_WTL_0368_18Feb07.jpg
02/19/2007	12:08p	299,931	MT7007_WTL_0369_19Feb07.jpg
02/19/2007	12:08p	307,141	MT7007_WTL_0370_19Feb07.jpg
02/19/2007	01:26p	304,845	MT7010_WTL_0376_19Feb07.jpg
02/19/2007	01:26p	295,216	MT7010_WTL_0377_19Feb07.jpg
02/19/2007	02:06p	320,115	MT7011_WTL_0378_19Feb07.jpg
02/19/2007	02:14p	310,421	MT7011_WTL_0379_19Feb07.jpg
02/19/2007	03:18p	302,123	MT7013_WTL_0381_19Feb07.jpg
02/19/2007	03:30p	305,185	MT7014_WTL_0382_19Feb07.jpg
02/19/2007	03:30p	306,130	MT7014_WTL_0383_19Feb07.jpg
02/19/2007	03:48p	296,889	MT7015_WTL_0384_19Feb07.jpg
02/19/2007	04:13p	301,387	MT7017_WTL_0386_19Feb07.jpg
02/19/2007	06:54p	355,953	MT7027_WTL_0395_19Feb07.jpg
02/20/2007	11:32a	295,879	MT7031_WTL_0399_20Feb07.jpg
02/20/2007	11:53a	317,575	MT7032_WTL_0400_20Feb07.jpg
02/20/2007	11:53a	327,645	MT7032_WTL_0401_20Feb07.jpg
02/20/2007	12:07p	330,251	MT7033_WTL_0402_20Feb07.jpg
02/20/2007	12:58p	297,917	MT7036_WTL_0406_20Feb07.jpg
02/20/2007	01:54p	293,665	MT7038_WTL_0407_20Feb07.jpg
02/20/2007	01:54p	305,271	MT7038_WTL_0408_20Feb07.jpg
02/20/2007	02:19p	328,917	MT7039_WTL_0409_20Feb07.jpg
02/20/2007	02:33p	324,749	MT7040_WTL_0411_20Feb07.jpg
02/20/2007	02:45p	311,623	MT7041_WTL_0413_20Feb07.jpg
02/20/2007	05:17p	321,240	MT7043_WTL_0415_20Feb07.jpg
02/20/2007	05:34p	313,819	MT7044_WTL_0416_20Feb07.jpg
02/20/2007	05:54p	336,988	MT7045_WTL_0417_20Feb07.jpg
02/20/2007	06:17p	344,646	MT7046_WTL_0418_20Feb07.jpg
02/20/2007	06:27p	342,238	MT7047_WTL_0419_20Feb07.jpg
02/20/2007	06:37p	342,630	MT7048_WTL_0420_20Feb07.jpg
02/20/2007	06:46p	372,328	MT7049_WTL_0421_20Feb07.jpg
02/20/2007	07:01p	263,703	MT7050_WTL_0422_20Feb07.jpg
02/21/2007	12:01p	319,435	MT7051_WTL_0423_21Feb07.jpg
02/21/2007	12:01p	303,860	MT7051_WTL_0424_21Feb07.jpg
02/21/2007	05:16p	311,191	MT7053_WTL_0427_21Feb07.jpg
02/21/2007	05:39p	303,691	MT7054_WTL_0428_21Feb07.jpg
02/22/2007	05:39p	300,524	MT7062_WTL_0434_22Feb07.jpg
02/22/2007	05:54p	323,728	MT7063_WTL_0435_22Feb07.jpg
02/22/2007	06:25p	292,199	MT7065_WTL_0438_22Feb07.jpg
02/23/2007	11:10a	285,853	MT7068_WTL_0439_23Feb07.jpg
02/23/2007	11:38a	289,399	MT7070_WTL_0442_23Feb07.jpg

02/23/2007	11:52a	302,644	MT7071_WTL_0443_23Feb07.jpg
02/23/2007	11:52a	285,589	MT7071_WTL_0444_23Feb07.jpg
02/23/2007	11:53a	310,925	MT7071_WTL_0445_23Feb07.jpg
02/23/2007	11:53a	303,753	MT7071_WTL_0446_23Feb07.jpg
02/23/2007	12:18p	276,799	MT7072_WTL_0447_23Feb07.jpg
02/23/2007	12:19p	269,897	MT7072_WTL_0448_23Feb07.jpg
02/23/2007	12:19p	288,435	MT7072_WTL_0449_23Feb07.jpg
02/23/2007	12:41p	289,598	MT7073_WTL_0451_23Feb07.jpg
02/23/2007	01:05p	307,805	MT7074_WTL_0452_23Feb07.jpg
02/23/2007	01:05p	309,295	MT7074_WTL_0453_23Feb07.jpg
02/23/2007	01:23p	318,425	MT7075_WTL_0455_23Feb07.jpg
02/23/2007	01:41p	307,405	MT7076_WTL_0456_23Feb07.jpg
02/23/2007	01:41p	302,081	MT7076_WTL_0457_23Feb07.jpg
02/23/2007	01:41p	317,351	MT7076_WTL_0458_23Feb07.jpg
02/23/2007	02:13p	291,970	MT7077_WTL_0459_23Feb07.jpg
02/23/2007	02:14p	298,905	MT7077_WTL_0460_23Feb07.jpg
02/23/2007	02:14p	313,877	MT7077_WTL_0461_23Feb07.jpg
02/23/2007	02:57p	301,533	MT7080_WTL_0465_23Feb07.jpg
02/23/2007	02:58p	298,363	MT7080_WTL_0466_23Feb07.jpg
02/23/2007	02:58p	278,666	MT7080_WTL_0467_23Feb07.jpg
02/23/2007	03:25p	308,737	MT7081_WTL_0468_23Feb07.jpg
02/21/2007	11:04a	294,834	MT8001_PHZ_0001_22Feb07.jpg
02/21/2007	11:04a	301,810	MT8001_PHZ_0002_22Feb07.jpg
02/21/2007	11:25a	264,440	MT8002_PHZ_0003_22Feb07.jpg
02/21/2007	12:31p	260,318	MT8007_PHZ_0007_22Feb07.jpg
02/21/2007	02:08p	324,746	MT8010_PHZ_0009_22Feb07.jpg
02/21/2007	02:08p	307,808	MT8010_PHZ_0010_22Feb07.jpg
02/21/2007	02:20p	292,509	MT8011_PHZ_0011_22Feb07.jpg
02/21/2007	02:38p	269,562	MT8012_PHZ_0012_22Feb07.jpg
02/21/2007	02:38p	228,730	MT8012_PHZ_0013_22Feb07.jpg
02/21/2007	02:38p	291,867	MT8012_PHZ_0014_22Feb07.jpg
02/21/2007	03:21p	342,608	MT8015_PHZ_0017_22Feb07.jpg
02/21/2007	03:38p	251,567	MT8016_PHZ_0018_22Feb07.jpg
02/21/2007	03:38p	233,280	MT8016_PHZ_0019_22Feb07.jpg
02/22/2007	12:13p	352,065	MT8024_PHZ_0036_23Feb07.jpg
02/22/2007	12:56p	317,046	MT8025_PHZ_0039_23Feb07.jpg
02/22/2007	01:11p	341,370	MT8026_PHZ_0040_23Feb07.jpg
02/22/2007	02:17p	264,453	MT8028_PHZ_0042_23Feb07.jpg
02/22/2007	02:47p	389,781	MT8030_PHZ_0046_23Feb07.jpg
03/08/2007	03:01p	433,974	MT8031_PHZ_0047_23Feb07.jpg
02/22/2007	04:27p	384,423	MT8032_PHZ_0048_23Feb07.jpg
02/22/2007	04:56p	350,508	MT8034_PHZ_0049_23Feb07.jpg
02/22/2007	05:19p	404,108	MT8035_PHZ_0051_23Feb07.jpg
02/22/2007	05:19p	340,656	MT8035_PHZ_0052_23Feb07.jpg
02/23/2007	02:00p	453,631	MT8049_PHZ_0076_24Feb07.jpg
02/23/2007	02:22p	348,451	MT8051_PHZ_0078_24Feb07.jpg
03/08/2007	02:47p	473,104	MT8052_PHZ_0079_24Feb07.jpg
02/23/2007	02:44p	314,691	MT8052_PHZ_0080_24Feb07.jpg
02/23/2007	02:44p	397,948	MT8052_PHZ_0081_24Feb07.jpg
02/23/2007	03:38p	461,679	MT8054_PHZ_0084_24Feb07.jpg
02/23/2007	03:38p	327,328	MT8054_PHZ_0085_24Feb07.jpg
02/23/2007	03:55p	279,895	MT8055_PHZ_0086_24Feb07.jpg
02/23/2007	03:55p	371,819	MT8055_PHZ_0087_24Feb07.jpg
02/23/2007	04:26p	449,286	MT8057_PHZ_0088_24Feb07.jpg
02/24/2007	03:00p	309,369	MT8069_PHZ_0108_25Feb07.jpg
02/24/2007	03:11p	302,145	MT8070_PHZ_0110_25Feb07.jpg
02/24/2007	04:20p	477,595	MT8073_PHZ_0115_25Feb07.jpg
02/24/2007	04:33p	282,539	MT8074_PHZ_0118_25Feb07.jpg
02/24/2007	05:06p	432,883	MT8075_PHZ_0119_25Feb07.jpg
02/24/2007	05:10p	367,496	MT8076_PHZ_0121_25Feb07.jpg
02/24/2007	05:30p	307,924	MT8078_PHZ_0123_25Feb07.jpg
02/24/2007	05:38p	287,550	MT8079_PHZ_0125_25Feb07.jpg
02/24/2007	05:50p	409,801	MT8081_PHZ_0126_25Feb07.jpg

02/25/2007	09:54a	393,946	MT8087_PHZ_0131_26Feb07.jpg
02/25/2007	10:07a	306,260	MT8088_PHZ_0133_26Feb07.jpg
02/25/2007	11:05a	313,151	MT8092_PHZ_0137_26Feb07.jpg
02/25/2007	11:32a	356,086	MT8094_PHZ_0140_26Feb07.jpg
02/25/2007	12:15p	352,648	MT8096_PHZ_0143_26Feb07.jpg
02/25/2007	01:56p	324,574	MT8100_PHZ_0149_26Feb07.jpg
02/25/2007	02:19p	364,358	MT8101_PHZ_0150_26Feb07.jpg
02/25/2007	03:18p	382,912	MT8104_PHZ_0154_26Feb07.jpg
02/25/2007	04:24p	340,709	MT8109_PHZ_0159_26Feb07.jpg
02/25/2007	04:38p	383,964	MT8110_PHZ_0161_26Feb07.jpg
03/08/2007	02:49p	373,064	MT8111_PHZ_0163_26Feb07.jpg
02/25/2007	05:22p	459,226	MT8114_PHZ_0166_26Feb07.jpg
03/08/2007	02:49p	413,038	MT8115_PHZ_0168_26Feb07.jpg
02/25/2007	06:01p	316,005	MT8118_PHZ_0172_26Feb07.jpg